This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

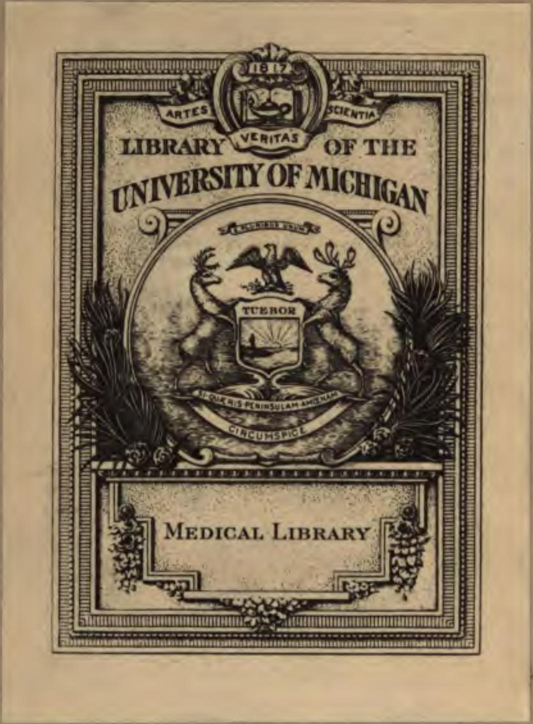
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

A 405431 DUPL



1817
ARTES VERITAS SCIENTIA
LIBRARY OF THE
UNIVERSITY OF MICHIGAN
E PLURIBUS UNUM
TUEBOR
SI QUAERIS PENINSULAM AMOENAM CIRCUMSPICE
MEDICAL LIBRARY

61
E
M
59

THE
EDINBURGH
MEDICAL AND SURGICAL
JOURNAL:

EXHIBITING

A CONCISE VIEW

OF THE

LATEST AND MOST IMPORTANT DISCOVERIES

IN

MEDICINE, SURGERY, AND

PHARMACY.

VOLUME THIRTY-SEVENTH.

1832.

UNIV. & BELL. HOSP. MEDICAL COLLEGE,
READING ROOM.

EDINBURGH:
PRINTED FOR ADAM BLACK, NORTH BRIDGE:
LONGMAN, REES, ORME, BROWN, GREEN & LONGMAN, LONDON:
AND JOHN CUMMING, AND HODGES & SMITH, DUBLIN.

1832.

Printed by John Stark, Edinburgh.

THE

EDINBURGH MEDICAL AND SURGICAL JOURNAL,

No. CX.

CONTENTS.

PART I.—Original Communications.

Art. I. An attempt to demonstrate the Law which regulates the intervals of Conception in the human Female. By **John Roberton**, Esq. . . . . . . Page 1

II. A Critical and Experimental Inquiry into the relations subsisting between Nerve and Muscle. By **William Charles Henry**, M. D. 11

III. Contributions to Operative Surgery. By **George William Stedman**, M. D. 20

IV. History of the Scarlet Fever, as it appeared in the Island of St Bartholomew, in the years 1829 and 1830, tending to show that the Dandy is merely a modification of this disease. By **W. H. Cock**, M. D. 28

V. On Diseased States of the Kidney connected during Life with Albuminous Urine; illustrated by Cases. Part II. By **James Craufurd Gregory**, M. D. F. R. S. E. . . 54

VI. Medico-Legal Examination of two Cases of Death from Injuries of the Head, involving important questions in Medical Jurisprudence. By **Alexander Watson**, Esq. F. R. C. S. E. . . 95

VII. On the Use of the Persesquinitrate of Iron in Diarrhœa, and some other affections of the mucous membrane of the Alimentary Canal. By **William Kerr**, Esq. Surgeon, Paisley, . . 99

VIII. Case of Excision of the Elbow-Joint. By **David Kerr**, Esq. Surgeon, Aberdeen, ... 113

IX. Pathological and Practical observations on Infantile Remittent Fever. By **Robert Lewins**, M. D. 115

X. Cases and Observations in Medical Jurisprudence. [Continued from Vol. xxxv. 353.]—Case X. On the effects of Opium-Eating on Health and Longevity. By **R. Christison**, M. D. . 123

PART II.—Critical Analysis.

Art. I. A Practical Medico-Historical Account of the Western Coast of Africa: embracing a Topographical Description of its Shores, Rivers, and Settlements, with their seasons and comparative healthiness; together with the Causes, Symptoms, and Treatment of the Fevers of Western Africa: and a similar account respecting the other Diseases which prevail there. By **James Boyle**, M. C. S. L. 136

II. A Critical and Experimental Essay on the Circulation of the Blood; especially as observed in the Minute and Capillary Vessels of the Batrachia and of Fishes. By **Marshall Hall**, M. D. 164

III. 1. Die Asiatische Cholera in Russland, &c.—The Asiatic Cholera, as it appeared in Russia in the years 1830-31; from Official Documents and Reports. By Dr **J. R. Lichtenstadt**, . 178

2. An Essay on the Epidemic Cholera of India. By **Reginald Orton**, Surgeon, ... 179

3. Observations on the Nature and Treatment of the Cholera Morbus, now prevailing Epidemically at St Petersburg. By **George William Lefevre**, M. D. . . . . ib.

301777

4. Papers relative to the Disease called Cholera Spasmodica in India, now prevailing in the North of Europe, . Page 179
5. Letter to Sir H. Halford, &c., President of the Board of Health, on the tendency of the proposed Regulations for Cholera; with Observations as to the Nature of the Disease and the course to be followed immediately on its appearance in a family. By G. HAMILTON BELL, ... ib.
6. Cholera Morbus. A Short and faithful Account of the History, Progress, Causes, Symptoms, and Treatment of the Indian and Russian Cholera, &c. &c. &c. By JOHN AUSTIN, Surgeon, ib.
7. Published by Authority of the Lords of his Majesty's most Honourable Privy Council,—Papers relative to the Disease called Cholera Spasmodica in India, now prevailing in the North of Europe, with Extracts of Letters, Reports, and Communications, received from the Continent, ... ib.
8. Relation Historique et Médicale du Choléra-Morbus de Pologne; comprenant l'apparition de la Maladie, sa Marche, ses progrès, ses symptomes, son mode de traitement et les moyens préservatifs. Par A BRIERRE de BOISMONT, M. D. . . . ib.
9. Rapport sur le Choléra-Morbus. Lu à l'Académie Royale de Médecine, en Séance générale, les 26 et 30 Juillet 1831, . . ib.
10. Remarks on the Cholera Morbus, containing a Description of the Disease, its Symptoms, Causes, and Treatment, &c. &c. By H. YOUNG, M. D. 180
11. A Treatise upon Cholera Morbus, from the French of M. le Baron Larrey. By HENRY PATERSON, . . ib.
12. An Antidote to the pernicious doctrine of Non-Contagion, &c. &c. By HENRY BIRD, ... ib.
IV. Illustrations of Surgical Anatomy, with Explanatory References, founded on the Work of M. Blandin. By JOHN G. M. BURT, 210

PART III.—MEDICAL INTELLIGENCE.

On the Sunderland Cholera, ... 214
Report of the Edinburgh Board of Health, 16th November 1831, . 219
Notice regarding the Half-Pay of the Army Medical Officers, . 221
Glasgow Statistics, ... 224

NOTICES TO CORRESPONDENTS.

COMMUNICATIONS have been received from Drs CORRIGAN, KERR, and SHAPTER, and Mr PLAYNE.

The following works have been received:

Principles of Lithotrity; a Treatise on the Art of Extracting the Stone without Incision. By Baron Heurteloup, Doctor of the Faculty of Medicine, Paris. Illustrated with Plates. London, 1831. 8vo. Pp. 483.

Researches to establish the truth of the Linnæan Doctrine of Animate Contagions; wherein the Origin, Causes, Mode of Diffusion, and Cure of Epidemic Diseases, Spasmodic Cholera, Dysentery, Plague, Small-Pox, Hooping-Cough, Leprosy, &c. &c. &c. are illustrated by facts from the Natural History of Mankind, of Animals, and of Vegetables, and from the Phenomena of the Atmosphere. By Adam Neale, M. D., Physician to his Majesty's Forces during the Peninsular War. Lond. 1831. 8vo. Pp. 258.

A Practical Compendium of Midwifery, being the Course of Lectures on Midwifery, and on the Diseases of Women and Infants, delivered at St Bartholomew's Hospital by the late Robert Gooch, M. D. Prepared for publication by George Skinner, M. R. C. S. London, 1831. Pp. 358.

A Manual of Midwifery, or Compendium of Gynaecology and Paidonosology; comprising a new nomenclature of Obstetric Medicine, with a concise account of the symptoms and treatment of the most important diseases of Women and Children, and the management of the various forms of Parturition; illustrated by Plates. By Michael Ryan, M. D., M. R. C. Physician in London, &c. &c. Third Edition. London, 1831. Pp. 737.

A Synopsis of the Bones, Ligaments, and Muscles, Blood-Vessels, and Nerves of the Human Body. By William Sands Cox, Surgeon to the Dispensary, and Lecturer on Anatomy and Surgery at the School of Medicine in Birmingham. Birmingham and London, 1831. 12mo. Pp. 310.

Maingault's Illustrations of the different Amputations performed on the Human Body, represented by Plates designed after Nature; with Alterations and Practical Observations by William Sands Cox. London, 1831.

Practical Examinations on the Immediate Treatment of the Principal Emergencies that occur in Surgery and Midwifery, systematically arranged. Part the First. By W. S. Oke, M. D., &c. London, 1831. 8vo. Pp. 250.

The Anatomy of the Brain, with some Observations on its Functions. By Alexander Monro, M. D., F. R. S. E., Professor of Anatomy and Surgery to the University of Edinburgh. To which is prefixed an account of Experiments on the Weight and Relative Proportions of the Brain, Cerebellum, and Tuber Annulare in Man and Animals, under the various circumstances of Age, Sex, Country, &c. By Sir William Hamilton, Bart. Illustrated by Coloured Engravings. Edinburgh, 1831. Pp. 62.

Practical Remarks on the Nature and Treatment of Fractures of the Trunk and Extremities; being the substance of that portion of his Lectures which relates to this subject. Illustrated by Plates, Wood-cuts, and Cases. By Joseph Amesbury, Surgeon, Fellow of various Learned and Scientific Societies. London, 1831. 2 Vols. 8vo. Pp. 830.

Elements of Surgery. By Robert Liston, Fellow of the Royal Colleges of Surgeons in London and Edinburgh, &c. &c. &c. Part Second. London and Edinburgh, 1831. 8vo. Pp. 334.

Lectures on Anatomy. Interspersed with Practical Remarks. Vol. III. By Bransby B. Cooper, F. R. S., Surgeon of Guy's Hospital, Lecturer on Anatomy, &c. &c. London, 1831. 8vo. Pp. 300.

Commentaries on some of the more Important Diseases of Females. In Three Parts. By Marshall Hall, M. D., F. R. S. E. London, 1827. 8vo. Pp. 376.

Commentaries principally on some Diseases of Females which are in the nature and origin Constitutional. By Marshall Hall, M. D., F. R. S. E., &c. &c. Second Edition. In Two Parts. London, 1830. 8vo. Pp. 284.

Researches principally relative to the Morbid and Curative Effects of Loss of Blood. By Marshall Hall, M. D., F. R. S. E., &c. &c. London, 1830. 8vo. Pp. 303.

Proposal of a Plan for the Investigation of the Due Administration of Blood-letting. By Marshall Hall, M. D., F. R. S. E., &c. 8vo. Pp. 14.

On a Morbid Affection of Infancy, arising from circumstances of Exhaustion, but resembling Hydrocephalus. By Marshall Hall, M. D., F. R. S. E. London, 1829. Pp. 40.

Engravings of the Nerves. By E. Mitchell, Engraver. With Explanatory Letter-press, by Dr Knox. Nos. 14, 15, 16, 17.

Principles and Practice of Obstetric Medicine, in a series of Systematic Dissertations on Midwifery, and on the Diseases of Women and Children; Illustrated by numerous Plates. By David D. Davis, M. D. M. R. S. L., &c. &c. London, 1832. 4to. Part I. Pp. 24.

Observations and Experiments on a new mode of Treating Fractures of the Leg and Fore-arm, especially Compound Fractures. By William Beaumont, M. R. C. S. and Surgeon to the Faringdon Dispensary. London, 1831. 8vo. Pp. 31.

General Remarks on the Health of English Manufacturers; and on the need which exists for the Establishment of Convalescents' Retreats, as subservient to the Medical Charities of our large towns. By John Roberton, one of the Surgeon to the Manchester Lying-in Hospital, &c. London, 1831. 8vo. Pp. 36.

A Corn. Celsi Medicinæ, Libri Octo. Ex Recensione Leonardi Targæ, quibus accedunt Tituli Marginales perpetui, capitum, librorumque; Annotationes Criticæ, Medicæ, Physicæ; Tabulæ Characterum, Ponderum, Mensurarum, aliæque; Indices Materiæ Medicæ Celsianæ, Rerumque locupletissimi: prefixa de Celsi vita Dissertatione. Concinnavit, Indice jam Delphiniano Auxit, Eduardus Milligan, M. D. S. A. S. S., &c. &c. Editio 2d. Auctior et Castigatior. Edinburgi, 1831. 8vo. Pp. 639.

We cannot acknowledge the receipt of this volume without saying, that by the labours of the indefatigable editor, it is rendered nearly as complete as any edition of a classical author for ordinary use can be. The formation of a very minute verbal index, in imitation of those annexed to the Delphin editions, must be of extreme use to those who require to refer to the Roman physician for the authority of Latin terms used by physicians. In short, by this edition of Celsus, the study of the classical language of the author, as well as of his valuable matter, is extremely facilitated to every one who has a competent knowledge of the language.

Translation of M. Lugol on the Use of Iodine. By Dr O'Shaughnessey. 1831. London. 8vo.

The Medico-Chirurgical Review, and Journal of Practical Medicine, New Series, No 30. October 1831. Edited by James Johnson, M. D. &c. London.

London Medical Gazette, Nos. 1 to 10, from October to 10th December 1831.

The London Medical and Surgical Journal, Edited by Michael Ryan, M. D. Nos. 39, 40, and 41. London. September, October, November, 1831.

THE

EDINBURGH

MEDICAL AND SURGICAL JOURNAL.

1. JANUARY 1832.

PART I.

ORIGINAL COMMUNICATIONS.

Art. I.—*An attempt to demonstrate the Law which regulates the intervals of Conception in the human Female.* By John Roberton, Esq. one of the Surgeons to the Manchester Lying-in Hospital and Dispensary for the Diseases of Women and Children.

IT is well known that all the larger graminivorous quadrupeds of this country have a single period of ardour annually, and that they bring forth their young in the spring. From such a law mankind would seem to be wholly exempted, since about an equal number of children is born in each of the months of the year. The final cause of this characteristic difference is sufficiently obvious. Man, by the use of his rational faculties, is able to provide nourishment and shelter for his new-born offspring in every season; but the inferior animals (I allude particularly to those that pair) are not thus circumstanced. Hence their periods of conception and parturition are so determined by instinct, that their young are brought forth at *that season* of the year when the food designed for them by nature is beginning to grow, and will be plentiful by the time of weaning.

In all our *graminivora* which bring forth once annually, the season for conception is determined by the length of uterine gestation in each species, the *end* of the law being to secure the birth of the offspring in the spring. The *immediate* cause of this unvarying arrangement is extremely obscure. What, for example, can be more inexplicable than such facts as these? The mare and the ass, which go with young nearly twelve months, foal in the spring; and in order that a new progeny may be ready by the next vernal period, they receive the male almost immediately,—the ass on the seventh and the mare on the ninth day after parturition. The cow, whose pregnancy extends to nine months only, does not conceive till three months after calving, that is, at midsummer. The sheep and the goat, which carry their young about five months, do not become in heat till the end of autumn, that is, about seven months after parturition. In the last place, I may instance the hare; she goes with young only for about thirty days, and receives the male in the beginning of February, which is eleven months after parturition. Many other facts of a similar kind might be adduced; but these are sufficient to prove that the fecundity of our graminivorous quadrupeds is regulated by a law, which, for want of a better name, we call that of instinct, the *end* of which, as has just been remarked, is obvious; but the *immediate* causes, differing, as they doubtless do, in the different species enumerated, lie beyond the reach of our knowledge *.

The fecundity of mankind is then obviously independent of that periodical instinct which regulates the fecundity of quadrupeds. But here an important, and, as far as I know, a *novel* question presents itself; namely, *that since the duration of human pregnancy is only nine months, the same as in the cow and the deer, how does it happen that women do not conceive and bring forth annually as well as they?* It is clear that there must be some law in operation which prevents this result, since it is well known that the ordinary interval between successive births in the same mothers, when the children live to be suckled, is *about two years*. This interval, be it a little more or less, coupled with the fact of human pregnancy continuing only nine months, shows that the fecundity of women is *by some means* restrained, or rather regulated, with something of the same general certainty that happens in brutes from instinct.

A slight consideration of the circumstances of the offspring of the human kind, compared with those of the young of brutes, leads *a priori* to the inference that there *ought to be* longer intervals between successive births in women than in brute females. Were human births annual, one child would be still dependent on the maternal aliment, and in all other respects helpless, when another devolved upon her care; and in a few years there would be an accumulation of feeble progeny sufficient to exhaust the constitution, as well as the moral energies and resources, of the most vigorous and affectionate mother. Moreover, the bodily peculiarities of a child are such as show that it will naturally be longer dependent on the milk of the mother than the young of the lower animals. At the expiration of two years, a child, in the power of self-preservation, and as possessing the ordinary qualities of an animal, scarcely equals the young of any of our domestic quadrupeds at the age of two or three weeks. The condition of the mouth is one point in which the difference is the most remarkable. Most, if not all, quadrupeds come into the world having the incisor teeth fairly protruded through the gums; and in the third or fourth month (in the calf for example,) the milk teeth are completed,—an event which may be considered as indicating the natural period of separation from the dam. In the child, the natural period of weaning is, by the same indication, at about the end of twenty-four months. It is true that very few of our women could suckle so long; nor is it absolutely necessary, with so many artificial substitutes for the maternal milk, that weaning should be deferred till this late period; yet, as we shall afterwards find, children *among the rude tribes of our species* are suckled quite up to *this* the natural weaning-time. And though I am far from intending to represent a barbarian mother's management of her child as a model for imitation, I am persuaded that the inirritable brute-like constitution of a barbarian woman is fitter in general to represent the type of the *nutrix hominum*, as nature made her, than that of the excitable female of modern civilization.

---

* It is the popular notion that the period of the year at which animals breed is determined by the heat of the weather. But this is clearly at variance with the above facts.

If then it be true, notwithstanding the absence of periodicity in the generative function in women, and the fact of utero-gestation in her continuing for nine months only, that the intervals between the births of successive children which live to be weaned is about twenty-four months, what is *the cause* which thus regulates the pregnancy of conception?—a cause, whatever it may be, which obviously takes the place of instinct in brutes; and though operating with less precision than instinct, yet operates with general uniformity.

There is an opinion entertained by the vulgar in this, and perhaps in all other countries, whether barbarous or civilized, that women do not ordinarily conceive during lactation. It is thought that so long as the secretion of milk continues in the breasts, the uterus is not in a state fit for conception. This is, strictly speaking, the opinion of the vulgar alone. Scarcely one of our writers on physiology or midwifery has even alluded to it; and those who have deigned to notice this opinion, represent it as being, at least in a great measure, an unfounded prejudice. Haller speaks of it thus; "lactation does not prevent pregnancy, although it is universally believed to have that effect." * And Dr Blundell assures us that suckling is no certain preventative of pregnancy. According to this opinion of these eminent physiologists, woman is placed by nature in a very different and much more unfavourable situation, as regards the production of offspring, than quadrupeds. Her term of gestation is the same as that of the middle-sized *graminivora*, namely, nine months, and her progeny are far more delicate and feeble, and require more, and much longer continued care than that of brutes; nevertheless it would seem, that, being confessedly destitute of that instinctive periodicity in the exercise of the generative function which attaches to brutes, she is also destitute of all periodicity whatever, as regards the parturient function; and is under the influence of no law, in this matter, except that originally promulgated,—"multiply and replenish the earth."

If such be the case with woman, then is she the most hardly dealt with of all animals. Let us suppose that every matron were to bring forth a child once every year,—and if she is under the influence of no restraining law this may occur,—it is clear that her maternal duties would be extremely onerous; in fact the task would be far too great for any except the wealthy, a very small fraction of mankind, who alone are able to procure helps both in suckling and tending; a supplemental aid, too, to be purchased only, it ought to be remarked, by the sacrifice in general of the infants of those who are degraded enough to hire out their breasts for money. ‡ That instances of annual parturition do occasionally happen is well known; and when they occur among the poor, they are almost invariably productive of great infantile mortality, as well as of much exhaustion and premature senility in the mother.

That there is something more in the vulgar belief respecting the influence of lactation in retarding conception than physiologists have allowed, had long appeared to me probable. Following the advice of Hunter, not to rest satisfied with *thinking* but to *try*, and having ample opportunities, I was induced to bring the popular opinion to the test of inquiry. With this view certain questions were put, as convenience offered, to a considerable number, namely, 160, of the more intelligent of those married women who resort, in a state of pregnancy, to the board of our hospital, for the purpose of being registered as home-patients. As I was careful to make the inquiries myself in every instance, and with proper deliberation, I have no doubt whatever of the general accuracy of the results. I would, however, advise others who may have similar opportunities to investigate the subject for themselves.

---

* Elementa Physiol. T. vii. Pars ii. p. 143.

Respecting these 160 women, I may, in the first place, state the following facts. Their average age was 30½ years; their aggregate number of births 686, that is, 4¼ for each woman; the number of children which lived to be weaned 512, or 3⅕ for each; and the average age at which they weaned their children 15½ months.

Of these women I found that 81 had become pregnant once or oftener during lactation, and that the remainder, 79, had never conceived under the same circumstances.

Of these 81 women who had become pregnant during suckling, I found that 27, who had produced 101 children, had conceived only 38 times during lactation; that 42, who had always become pregnant while suckling, did not, on the average, conceive till they had suckled for 19⅓ months nearly; and that 22, (the remainder of the 81 women,) had been in the habit of conceiving during lactation, and soon after parturition.

The average age for weaning their children was different in the two classes of women,—in those, namely, who had not conceived during suckling, and those who had conceived once or oftener while so engaged. For the 79 women composing the former class, it was 14¼ months; and for the 81 women of the latter class, it was 15⅔ months.*

It further appeared as a general fact, that in healthy women, when the child was still-born, or when it died soon after birth, another birth took place within the ensuing twelve-months; and that, speaking generally also, women under forty years of age,

---

* Of the above 160 women, *ninety-nine* had never menstruated during suckling. Of the remainder, 61, the facts may be placed in a tabular form.

One woman who had suckled 3 children menstruated only in one instance of lactation.

Two women do. 7 children each do. each only in one do.
Four do. do. 6 do. each do. each only in one do.

One woman was in the habit of menstruating after suckling 4 months.

Four women were	after	6	do.
Two	do.	7	do.
Two	do.	8	do.
Two	do.	9	do.
Two	do.	10	do.
One	do.	11	do.
Seven	do.	12	do.
Two	do.	14	do.

Thirty-one menstruated regularly during lactation.

I ought not to omit remarking, that of those women who had usually conceived while yielding suck, I found that the majority did not menstruate; that in fact the appearance of the *catamenia* during lactation did not appear to have any influence in disposing to conception.

and in health, conceived in from *one to three months* after weaning, whether that event happened at an early or at a comparatively late period after parturition.

The *first* corollary which I would draw from the foregoing facts is, that in seven out of eight women who suckle for as long a period as the working classes in this country are in the habit of doing, there will elapse *an interval of fifteen months* from parturition to the commencement of the subsequent pregnancy.

Second, That in a majority of instances, when suckling is prolonged to even nineteen or twenty months, pregnancy does not take place till after weaning.

Third, That lactation has an influence on the generative function; that up to a late period in suckling, probably in this country about fifteen months, conception does not in general occur; and that hence we are warranted in regarding the secretion of milk as the CAUSE which regulates the periods of conception in mankind, as instinct operates to the same end in graminivorous quadrupeds, and probably in all other animals.

It will not, I apprehend, be denied, that in every instance in which conception occurs at an early period of lactation, the infant is placed thereby in a situation more or less disadvantageous; and that upon the whole such rapid fecundity is equally unpropitious to both the mother and her offspring. This being admitted, it comes to be a question, (since nature evidently intends that a considerable time *should* elapse between succeeding births,) whether, in those exceptions to the law which we occasionally witness, the blame rests with nature, or with circumstances which are not natural but artificial. It appears to me that an attentive consideration of the circumstances of the infant, particularly with reference to the organs of mastication, as I before remarked, furnishes the strongest presumptive evidence that it was intended the child should receive the maternal milk for a considerably longer time than could happen, were the mother to bring forth once every year. It follows, therefore, that so long as the infant is, through its physical condition, dependent on the milk of the mother, (which we have seen is the case until it has nearly completed the deciduous teeth,) so long ought the mother, in fulfilment of the natural law, to be in a condition to yield this aliment. If it should be said that reason, which brutes do not possess, enables the mother, by the use of artificial food, to dispense with the breast at any age whenever the occurrence of pregnancy may render it necessary, I would reply, that on the same plea suckling might be dispensed with altogether, since it is certain that, under favourable circumstances, infants may be reared by the hand alone. The point at issue, therefore, is, not *what may be done* by enlightened management, but only what nature's intentions are in the matter; and these, so far as I can trace them, seem to be that the mother shall suckle her child till it attains the age of about twenty-four months.

I am very far from thinking, or intending to assert, that it is desirable generally for mothers, in the present state of society, to prolong the period of suckling to more than half this duration. Few, comparatively, in towns, and in the middle and upper classes of society, are able to continue it longer than nine or ten months without experiencing more or less exhaustion; and those, under such circumstances, who persevere, at all hazards, for eight or ten months longer, often entail on themselves the most alarming and obstinate debility. Besides, there are many who are never able to bear the drain of lactation at all. But what do these facts amount to? Do they impugn the natural law of lactation? Clearly not. The original laws of the human constitution exist, and ever will continue, however much the artificial habits of a portion of mankind may set them at defiance. To mention, by way of example, a well-known case. It is unquestionably a law of our constitution, that we should feel gratified and refreshed by the odour of the rose, and by other mild scents, yet no fact is better authenticated, than that the ladies of modern Rome are not thus affected by (what to us are) agreeable odours; but, on the contrary, that they are thrown into convulsive and other distressing nervous affections by them. "This influence," says Dr Clark, "is chiefly felt by the females, though the males are not insensible to it." * Here we have an instance of over-refinement producing a morbid sensibility of the sensorium, which converts a simple and pure source of natural enjoyment into a source of suffering and disgust, thereby reversing or rather annulling a general beneficent law of the Creator.

These remarks lead me to inquire, (and the inquiry shall be a brief one,) respecting the manner in which the ruder tribes of our species, whose nervous system, and organic functions generally, are far less under the influence of disturbing causes than ours, fulfil the natural law of lactation. It is well known that among every people women are treated with greater lenity and kindness by the other sex, in proportion to the advancement they have made in civilization. Hence among barbarians women constitute what may be denominated the *labouring class.* Women cultivate the fields, they sow, they reap, they fell and convey home the wood, they carry the baggage in all the movements of the tribe; and, in fine, are compelled often, on the scantiest fare, to lead an incessantly active and toilsome life. In such a state of society, all the feeble and delicate, (particularly if they are females which are little regarded,) are sure to perish in infancy. Only the robust are ever likely to live to adult age, and become mothers. Owing to this cause, as well as their hardy manner of life, the women of savages greatly excel the women of civilized countries, in the endurance of toil, and in the possession of inirritable brute-like health.

---

* Clark on Climates, p. 156.

To whatever causes we are to ascribe the frequency of procured abortion and infanticide among barbarian women, there can be no doubt that natural affection, after a child has been deliberately taken to the bosom and care of the mother, is as strong in them as in us. This is confirmed by abundant testimony. Among the various peculiarities to be observed in their manner of managing their children, perhaps (to us) the most remarkable is the great length of time they retain them at the breast,—a practice they are enabled to follow among some races of people, by the custom of avoiding co-habitation during the period of lactation; and among others, where cohabitation is not interrupted by the long intervals which, it would appear, occur between succeeding births. In selecting a few facts to exemplify this trait of rude manners—I mean the long duration of suckling—I shall confine myself to such races as are confessedly in a low state of civilization, and of whose manners we possess credible accounts.

To begin with the Abipones, a people with whose domestic history we have been made familiar, Dobrizhoffer tells us that it was the practice of their women to suckle a child three years.* The Keebets, another south American tribe, suckled for the same length of time.† Of the Mexicans, we learn that it was the uniform practice among them to suckle their children for *several* years.‡ The same circumstance is remarked regarding several of the tribes of the Canadian Indians.§ And Dr Winterbottom has stated that the negroes of Sierra Leone suckle till the children are two years old, or till they can bring the mother a calabash of water.‖ In all these instances the mothers are not allowed to cohabit with their husbands till after weaning. In the examples which follow, this temporary kind of divorce did not obtain.

I will mention first the North American Indians. Among those visited by the party of James, in their journey to the Rocky

---

* Dobrizhoffer, Vol. ii. p. 97.

† Southey's Brazil, Vol. iii. p. 402.

‡ Herrera and Gomera, quoted by Robertson.

§ Charlevoix, Nouv. France, T. iii. p. 288.

‖ Winterbottom, Vol. i. p. 149.

Mountains, the mother had often two successive infants at the breast at the same time, "the eldest of which might be three years old."[*] Of the Potawatomi, a more northerly race of Indians, Keating reports that they continue to suckle their children for a great length of time; in some instances for three, four, or more years, if no subsequent pregnancy occur. In one case, he remarks, a mother was observed giving the breast to a child twelve years of age. Meta, an intelligent chief, informed the party, that he had never heard of a woman's milk wholly failing while she was giving suck.[†] Among the Dacotas the same intelligent writer observes, "children are suckled for a long time, from two to five years, generally till a new pregnancy interrupts the secretion of milk."[‡] Concerning the Cree Indians, a still more northerly race, Captain Franklin informs us, that their women marry very young, and have a practice of suckling their children for several years,—a custom which, together with the fatigue and famine to which they are often exposed, renders them unprolific.[§] In addition to these authorities, one of our best writers on Indian manners has said, that the Chipewyan women (the Chipewyans are a vast family of westerly Indian tribes,) "suckle their children till they have another child."[‖]

Of the Esquimaux and the Greenlanders, we possess abundant testimony to the same effect. Captain Parry has said that the former suckle their children to the age of three years, but that occasionally a child of five years is to be seen at the breast "The time of weaning," he remarks "must, in some instances, depend on the mother's again becoming pregnant, and if this succeeds quickly, must, as Crantz relates of the Greenlanders, go hard with one of the infants. Nature, however, seems to be kind to them in this respect; for we did not observe *one instance*, nor hear of *any*, in which a woman was put to this inconvenience."[¶] Crantz and Egede make a similar statement concerning the women of Greenland.[**] Lesseps says that the Kamtschadale women sometimes suckle for four or five years.[††] Pallas, that the Ostiaks, a rude race, suckle for as long.[‡‡] Krashennicoff that the Keroki, another race of Northern Asia, doctrines, that of Haller maintained a decided ascendency, till the experiments of Legallois revived the earlier hypothesis, and insured its almost universal adoption. * But the relative positions of the two theories have been again reversed by the labours of Dr Wilson Philip, who detected a fundamental error in the mode of research pursued by Legallois, and is supposed to have re-established the Hallerian doctrine. A careful survey of all that has been advanced on both sides of this important controversy has, however, impressed me with the superior cogency of the facts and analogies of the neurologists. It has further appeared to me possible to gather, by an indirect process, some fresh experimental testimony, and in this way to approach the determination of a question, which, in its nature, admits of no higher proof than is derivable from a comparison of probabilities. Before describing these experiments, I shall premise a few remarks on the state in which the argument has been left by antecedent writers.

---

[*] Expedition to the Rocky Mountains, Vol. i. p. 149.

[†] Expedition to the Source of St Peter's River, Vol. i. p. 131.

[‡] Ibid. Vol. i. p. 435.

[§] Franklin's First Journey, 4to, p. 60.

[‖] M'Kenzie's Travels in N. America, p. 122.

[¶] Parry's Second Voyage, 4to, p. 527, see also Captain Lyon's Journal, pages 120 and 149.

[**] Egede's Description of Greenland, p. 146, and Crantz's Greenland, Vol. i. 149.

[††] Lesseps' Travels in Kamtschatka, Vol. i. p. 134.

[‡‡] Pallas, Voyages, &c. Tom. iv. p. 72.

The main facts to which the modern disciples of Haller appeal, in proof of the independence of the muscular fibre, are, 1*stly*, The persistence of the motions of the heart, after the destruction of the brain and spinal marrow, and even after the entire removal of the heart from its connexions with the body; and, 2*dly*, The total inefficiency of stimulants applied to the cardiac or intestinal nerves.

1*stly*, That the pulsations of the heart survive the removal of the brain and spinal cord was well known to Haller, † and even to several of his predecessors. Dr Whytt ‡ too was so far from calling the fact in question, that he has related an experiment which might have furnished the prototype of that, upon which Dr Philip's mainly reposes. On the other hand, it had been more recently asserted by Legallois, and attested by a Commission of the French Academy, that, though the movements of the heart are not suspended by excision of the brain, yet that they are instantly arrested by destruction of the spinal medulla. But Dr Philip has since unequivocally proved, that the *gradual* removal of the spinal marrow does not cause cessation of the heart's motion; and he has thus restored the earlier observation to its place among established truths. It is in the inference which he has drawn from this fact, that he appears to me to have gone further than is warranted by the rules of cautious induction. Justly interpreted, his experiment can prove no more than the independence of the heart, (and, by analogy, of muscular fibre generally,) of influence derived from the *brain* and *spinal cord;* but not, as he has contended, of influence derived from *any portion* of the nervous system. For the opinion of Scarpa and Prochaska, that the nerves themselves continue capable of fulfilling all their customary offices, (except of course that of conducting sensations and volitions) after entire separation from the central masses, rests upon the strongest experimental evidence. Thus it has been long known, that irritation of the lower ends of divided nerves occasions contractions of the muscles to which they are distributed; and Mr Brodie has shown, by a well-devised experiment, that this power subsists in the nerves of frogs, several months after total interruption of the connexion of those nerves with the spinal marrow. Moreover, in the experiments of Dr Philip, the heart was left connected with the ganglionic system;—a system which is of anterior developement, in the scale of organization, to the brain and cord, and which is believed to preside over the functions of organic life.

---

* Bostock, Elem. System, Vol. i. p. 307.

† Elem. Phys. Lib. iv. Sec. v. § ii. and xiv.

‡ Physiol. Essays, 3d Ed. p. 189.

To all the experiments of Dr Philip, it may therefore be legitimately objected by the neurologists, that the heart, cut off from connexion with the great nervous masses, derived its power of continued action from the system of ganglia, and from the nervous filaments diffused through its substance, and expanded upon its cavities. By complete excision, the heart is of course removed from the influence of the ganglia; but there still remains a vast amount of nervous matter in the form of branches and filaments, which may be fairly assumed to be the medium of transmission. In other muscular parts, as completely separated from the body, *we know* that the nerves, interspersed through their tissue, continue for some time capable of communicating motive impressions. Thus the muscles of an amputated limb may be made to contract by stimulating the divided nervous trunks. In this case, the muscles obviously receive the stimulant impression, in the same line of direction as that in which they have been habitually influenced by the will. The heart, in like manner, continues to pulsate out of the body, because the stimulant of fluid or air is presented, in the usual mode, to the nervous fibrils expanded on its cavities. At all events, since the motions of the *separated* limb are undoubtedly induced through the medium of nerve, the fact of the continuance of the heart's motion, after similar *separation,* cannot be received as evidence against nervous mediation.

2dly, The weight of experimental testimony is against the position, that the heart is *wholly*[*] indifferent to galvanic agency conveyed through the cardiac nerves. But even were such indifference proved, it would not establish the Hallerian doctrine. For all physiologists are now agreed that the heart is capable of being influenced through the medium of the nervous system. Thus, Haller himself admits that irritation of the *medulla oblongata* excites vehement pulsations of the heart*. Both Legallois and Dr Philip have shown that its motions are suspended by *sudden* destruction of the brain and cord; and the latter has farther observed, that the pulsations of the heart may be accelerated or retarded by chemical agents applied to large portions of the nervous centres. The heart then may be strictly said to be excitable, like any other muscle, through the medium of nervous matter, since its alternate motions of systole and diastole, which correspond to the longitudinal contractions of voluntary muscles, are producible by nervous irritation. Now such motive impressions must be propagated to the heart from the central masses down its nerves, and it is therefore impossible to deny the existence of *motor* filaments in those nerves. The heart and voluntary muscles, in fine, differ in their relations to nerve, only in this point,—that the latter are excitable by direct irritation of their *small* nerves, while the motions of the heart are experimentally induced mainly through the *larger* nervous masses. In both alike, nervous substance is the first recipient of the stimulant impression.

---

[*] See the experiments of Johnstone, Fowler, Humboldt, Laghi, Rossi, &c. It would be unreasonable to look for the *same* amount of effect from the galvanic

The facts then, to which Dr Philip and others have appealed in proof of the Hallerian doctrine, are, to say the least, equally explicable on the neurological theory. And if we admit an equality of evidence, the strict rules of philosophizing will entitle the latter doctrine to a preference. It is universally admitted that the voluntary muscles, in all their natural and sympathetic contractions, are excited through the medium of nerve; and the same sequence of contraction to nervous change may be predicated, with little less confidence, of the *natural* actions of the involuntary muscles. For the stimulants of muscles of this

---

influence upon the cardiac nerves, as is observed when that influence is directed upon the nerves of voluntary muscles. For the last mentioned nerves *constantly* receive the motive impression from the brain, while the motions of the heart are only *occasionally* affected by that nervous centre. The blood is the natural stimulant of the heart, and is applied to the sero-fibrous membrane which lines its cavities. There is, therefore, a strong *a priori* probability, which in the course of this essay will be further strengthened by direct experiment, that the main portion of nervous matter in the heart is so distributed as to conduct impressions directly from sentient expansions on its cavities, to the motive filaments supplying muscular fibres. Since Mr Bell has proved that a simple nervous fibril can convey impressions only in one direction, we cannot then compare the effects of galvanic excitement upon the divided ends of the cardiac and of the voluntary nerves. To constitute an exact parallel, it would be necessary that the stimulant should be directed upon the nerves of the inner surfaces of the heart. The results of such direct agency will be speedily made known.

* Elementa, Lib. iv. S. v. § ii.

class are never brought into contact with bare fibres, but are always applied to the impermeable membranes, either sero-fibrous or mucous, by which the muscular tissue is overspread. It is scarcely possible to conceive any channel but that of nerve, through which the stimulant can operate upon the subjacent fibre [*]. Each hollow bowel has, too, its *specific* stimulants, natural as well as foreign. Moreover, the hollow muscles are more readily and vividly acted upon by stimulants applied to their inner than to their outer coat, or even than to their contractile fibres [†]. This fact is strikingly confirmed by experiments 9 and 10, and appears to me inexplicable but on the theory of nervous intervention. Since then the muscular fibre, whether voluntary or involuntary, receives, in all its *natural* actions, the stimulant impression through nerve, it is most probable that the habitual relation is universal; and that the sequence of muscular to nervous change is unvaried. It would have been inconsistent with the prospective economy of nature to have conferred upon muscular fibre properties, which could never have been exercised by that fibre, except when artificially denuded.

But a claim to *more* than equality of testimony, may, it appears to me, be now urged in favour of the neurological theory. The experiments about to be related will scarcely bear a twofold interpretation, and seem to furnish positive evidence of the constant antecedence of nervous excitation to muscular contraction. To remove, with the scalpel, all the nervous matter dispersed through muscle is obviously impossible. But the operation of the narcotic poisons almost supplies the place of such a dissection. Whatever be the channel through which those poisons affect the system; whether they are actually carried with the blood to the brain and medulla; or whether, as the recent experiments of Messrs Morgan and Addison [‡] seem to demonstrate, they act sympathetically and remotely on those organs, through the sentient extremities of the nerves of the blood-vessels, still all toxicologists are agreed that it is upon nervous matter exclusively that their agency is exerted. According to the dose, they enfeeble or annihilate nervous power, and in this way extinguish life. Now it is known that in ordinary death the irritability of the muscles survives, for some time, the more obvious phenomena of vitality. A great accession of proof would therefore be gained by the neurologists, if it should appear that stimulants are inefficient after death induced by narcotic poisons, in other words, that irritability and nervous influence are strictly co-existent, and their extinction precisely synchronous. In a science not mathematical, it is difficult to conceive closer evidence of a relation between two properties or phenomena, than that the suspension of the one is uniformly followed by that of the other. It was with the hope of obtaining such evidence, that the following experiments were instituted.* Their origin, it is freely confessed, may often be traced to the essays of Whytt, whose ingenuity and fertility in research, and whose soundness of reasoning, seem to me to have been estimated by modern physiologists below their just value.

---

[*] Haller in the following passages, at variance, it is true, with the general spirit of the section, almost concedes the point in dispute. Elem. Lib. iv. S. v. § xiii. "Unicum est ut ideo cor magis irritabile sit, quod *nervi cordis sentientes* intimæ tunicæ cordis vicini, a sanguine proximo cominus stimulentur. An ideo adeo mobiles auriculæ et ipso corde magis irritabiles quod tenuissimæ *nervos* fere *nudos* sanguinis stimulo exponant?

[†] "Sed *interius* insigniter imprimis irritabilia sunt."

"Hæc *internorum* parietum cordis irritatio multo constantiorem quam *externa*, contractionem producit." Verum melior ratio quâ cor ad motum suscitatur fit *internà* superficie lacessitâ, &c.

Haller. Op. Minora, T. 1, p. 431 and 433. See also Elem. Lib. iv. S. v. § iv. and Whytt's Essays, p. 145.

[‡] Essay on the operation of Poisonous Agents, p. 90.

The mode which first suggested itself of acting upon nervous matter, was by the direct immersion of nerve in a sedative solution. In this case, Dr Bostock has stated that "the muscles, to which the nerve is sent, lose their contractility as entirely as if the sedative had been applied to the muscular fibres themselves." This assertion seemed to be confirmed by the following experiment.

Exp. 1. In a rabbit about six weeks old, the sciatic nerves and posterior muscles of the thigh were exposed on both sides. The nerves were divided at the same time, where they emerge from the pelvis, and were carefully detached for the space of about an inch from contiguous structures. The left sciatic was then immersed for the above space in the empyreumatic oil of tobacco, the right nerve remaining undisturbed. One wire of a galvanic combination was then plunged into the large muscles of the left thigh, and the other wire was applied to the end of the nerve moistened with the oil. After six minutes had elapsed, galvanic agency ceased to excite contractions of the left hind-leg; but the opposite limb remained excitable by the same stimulant for seventeen minutes, and would doubtless have continued so much longer, had not the absorption of the poison, which had spread into the wound of the thigh, occasioned death.

In this, and in several other experiments, it was observed that the galvanic wire brought into contact with the divided end of a nerve, or with the forceps by which the nerve was raised, excited muscular contractions, long after direct irritation of the fibres with the point of a scalpel had become inefficacious; †

---

* In the performance of these experiments I had the advantage of the skilful assistance of my friends, Mr Joseph Ransome and Dr Phillips.

† Whytt's Essays, p. 288, note.

and that the effect was much increased by forcibly extending the nerve. This experiment seemed conclusive, until it was found that Fontana* had discovered that only the portion of the nerve, which has been in actual contact with the poison, is rendered incapable of propagating a motive impression. The following modification of the experiment, therefore, became necessary.

Exp. 2. In a young rabbit, both sciatic nerves were exposed and divided as before. The trunk of one nerve was immersed in strong hydrocyanic acid. After six minutes, the galvanic wire, applied to the moistened end of the nerve, excited no contractions of the limb. The whole of the portion of nerve that had been touched with the acid, was then cut away, and the wire was applied to the fresh extremity. Vigorous contractions were excited in the limb, which were renewed by each successive appulse of the wire, as long as the experiment lasted.

Exp. 3. In another rabbit of the same age, the spinal cord, at its lumbar portion, was laid bare for the space of an inch. It was then cut across, and the oil of tobacco was dropped upon the surface of the medulla, so as to be brought into extensive contact with its inferior third. The muscles of the thigh being exposed, and the galvanic wire applied as before to the sciatic nerve, they continued irritable for upwards of six minutes after the death of the animal.

Exp. 4. The foregoing experiment was repeated in a full grown rabbit; but considerable difficulty was experienced in dividing the vertebral arches, and only a small space of medulla could be exposed. The irritability of the muscles of the thigh was not suspended, and even persisted after the sciatic nerve itself had been smeared with the empyreumatic oil.

Exp. 5. The frontal portion of the cranium was removed in a young rabbit, oil of tobacco and laudanum were dropped in considerable quantity, both upon the surface and into the substance of the brain. The animal expressed suffering; but the usual symptoms produced by those poisons did not manifest themselves; and it became necessary to destroy life, by plunging a sharp instrument into the *medulla oblongata.* After death, the muscles of the hind-leg obeyed the galvanic stimulant applied to their nerves.

It follows from these experiments, that sedatives, applied in their most concentrated form to the brain, to the spinal cord, or to the larger nervous trunks, destroy the activity of those portions of nervous matter only, with which they are in immediate contact; and that their agency is never extended downwards to continuous trunks or filaments. Hence it may be conjectured that the impressions of such poisons are received and transmitted exclusively by nerves of sensation, which are known to propagate changes only from their extremities upwards. This singular phenomenon of the inertness of poisons directly applied to *nervous tissue*, which are yet acknowledged to operate only upon the *nervous system*, has been often noticed by toxicological writers,* but has only lately been brought within the compass of a general principle by Messrs Morgan and Addison. All attempts to insulate muscular fibre from nervous influence, upon the principle of the foregoing experiments, must be necessarily unsuccessful. The only method of producing a general sedative effect was through the usual channel of mucous surfaces.

---

* Whytt's Essays, p. 229 and 231.

Exp. 6. A few drops of the oil of tobacco were poured into the mouth of a young rabbit. In less than thirty seconds the action of the poison became apparent, and in two minutes the animal was dead. An incision was instantly made into the hind-leg, and the muscles were stimulated both by the scalpel, and by galvanism applied through the divided sciatic nerve. Not the slightest contraction ensued. The axillary plexus was then exposed and irritated with a similar negative result.

Ex. 7. A large quantity of the watery solution of opium was injected into the rectum and stomach of a rabbit. It did not, however, occasion death for twenty-five minutes, owing to the escape of a portion of the solution. After death the muscles of the hind-leg were instantly exposed and stimulated, and were found, as before, perfectly inirritable. Both in this and in the previous experiment, the motions of the heart and intestinal canal continued vivid, long after apparent death.

It was thought unnecessary to repeat these trials, since numerous experiments of the same tendency have been already recorded by Dr Whytt, all concurring to show that the irritability of the voluntary muscles is destroyed by the *remote* action of powerful sedatives. Now it is established that these poisons suspend or destroy nervous energy. We are entitled then to infer the existence of an essential relation between irritability and nervous power, at least in the class of voluntary muscles.

But the great topic of controversy has always related to the actions of the *involuntary* muscles. In investigating these, Dr Whytt had observed, that the heart of a frog, which would continue to pulsate upwards of twenty-five minutes in clear water, became entirely inirritable after ten minutes immersion in solution of opium. The experiment, however, can scarcely be deemed conclusive in favour of nervous influence, for it may be objected that the fibres themselves may imbibe opium during the immersion, and that some specific action may be exerted by that sedative on the muscular tissue. The following experiments were instituted to decide this point.

---

* Dr Christison on Poisons, p. 22, 560, 617.

Exp. 8. The thorax of a young rabbit was laid open, and the beak of a small syringe, charged with the watery solution of opium, was introduced into the right auricle. A considerable quantity of the solution was thrown into the heart, then contracting vigorously. Its pulsations instantly ceased, and only a faint fibrillary contraction was produced, by directly irritating the walls of the ventricle with a scalpel or with the galvanic current. After seven minutes even this feeble action entirely ceased, and the heart became inirritable to all stimulants. But we had frequently observed, in former experiments, that the pulsations of the heart continued in rabbits upwards of twenty minutes after apparent death.

In the same animal the abdominal cavity was opened, and a quantity of the solution injected into an *ansa* of intestine, whose vermicular motions were at the moment extremely vigorous. No appreciable time elapsed between the admission of the opium and the total cessation of the peristaltic contractions, which could not be revived by pricking or lacerating the intestine. Precisely the same result was obtained by a similar injection into the intestine of the rabbit of Exp. 2.

Exp. 9 and 10. On opening the chests of the rabbits destroyed by narcotic poisons in experiments 6 and 7, their hearts were found contracting regularly, for upwards of twenty minutes after apparent death. Watery solution of opium was dropped upon the outer surface of the heart, in both animals, without interrupting its contractions. Injection of the same fluid into its cavities was followed by immediate cessation of all motion, and the heart became permanently inirritable. Since this experiment was made, I have found that nearly the same phenomena had been noticed by the late Dr Monro and by Dr Philip.

Thus then the involuntary agree with the voluntary muscles, in being rendered inirritable by narcotic substances. In the system of voluntary muscles, the remoteness of the part, into which the poison is introduced, proves that their irritability perishes, because the vitality of their nerves is destroyed; an inference consistent with general toxicological doctrines. Destruction of irritability by the same substance seems to indicate a like mode of operation on the *involuntary* muscles, and the instantaneousness of the action is inexplicable, except on the theory of nervous transmission. Opium, moreover, has never been shown to exert any direct influence on muscular structure. The fibres of the heart are protected by an equally impermeable membrane, both within and without its cavities; yet a narcotic, which, when poured upon the outer membrane, is totally inefficacious, instantly suspends all irritability when it touches the inner tunic. From the *continuance* of the heart's motions, after the *supposed* removal of all nervous influence by the destruction of the brain and cord, Dr Philip has inferred the *independence* of that organ on nervous power. From the *cessation* of those motions after the *actual* suppression of nervous influence by sedatives, are we not entitled to infer the *dependence* of the heart, and of muscular fibre in general, on nerve?

The foregoing experimental results may be thus briefly recapitulated.

I. The voluntary muscles may be excited to contract through their nerves, when direct irritation of their fibres is wholly ineffective.

II. The irritability of the voluntary muscles is destroyed by the remote action of sedatives on the nervous system.

III. The involuntary muscles (or more precisely the heart and intestinal tube) are instantly rendered inirritable by the contact of the same substances with their lining membranes.

These phenomena appear to me most consistent with the hypothesis, that the immediate antecedent of the contraction of the muscular fibre is a change in the ultimate nervous filament distributed to that fibre.

ART III.—*Contributions to Operative Surgery.* By GEORGE WILLIAM STEDMAN, M. D. Corresponding Member of the Medico-Chirurgical Society of Edinburgh, Extraordinary Member, and formerly President of the Royal Medical Society of Edinburgh, and Member of the Royal Practical Horticultural Society of Bavaria.

St Thomas, West Indies, 7th September 1830.

CASE 1.—*Extirpation of a large Scirrhous Tumour in the situation of the right Parotid Gland, preceded by the operation of tying the right Carotid Artery on the same side.*

JOHN SENSIRE, a free black, æt. 58, who gained his livelihood as a boatman in the harbour, consulted me, a fortnight ago, about a large tumour on the right side of the neck and jaw.

The tumour extended from behind the concha of the external ear to one inch below the angle of the jaw-bone. Upon the upper part, the tip of the ear, and part of the cartilage of the concha, were imbedded in the tumour, which extended on the fore part from a little below the malar bone to the upper portion of the thyroid cartilage. It dipped under the jaw-bone to the depth of nearly two inches.

The following are the dimensions of the tumour, of which a sketch is prefixed.

4½ inches in length from its attachment to the jaw.

16½ inches in circumference at its thickest part.

9½ inches from the base of the ear to the bottom of the tumour.

10½ inches across the middle of the tumour from the back to the front part.

The greater part was of a stony hardness; but there were two lobes on the top of the tumour which were softer, and over which the skin was thin, and of a reddish hue. These in a few days burst into ulceration, giving issue to a thin and fetid humour.

The disease, according to the patient's own account, commenced about twelve years before at the angle of the jaw, and was at first about the size of a walnut. It had gradually increased, until within the last year, when its progress became much more rapid, until it had reached its present size. Within the last year it has occasioned him much pain, which has latterly increased.

As soon as I examined the part, I determined on the propriety of its extirpation, as it appeared to me to afford the only chance of prolonging the man's life, before the ulceration should produce hectic fever. I was the more encouraged to this conclusion, as the patient seemed to possess a robust constitution, and was very intelligent for his station in life, so as not to be likely to throw any obstacle in the way of the after-treatment.

I thought it prudent, however, before proceeding to the operation, to call a consultation. The physicians consulted were Baron John Von Bretton, M. D., Dr Hornbeck, the King's Physician, and Dr Ravn, the garrison-surgeon of this place. These gentlemen concurred with me in the propriety of performing the operation, though they all represented it as a very bold and hazardous undertaking. I informed them, that, before I proceeded to extirpate the tumour, I was determined to tie the right common carotid artery, in order to prevent as far as I could the effusion of blood. A press of business prevented me from performing the operation until the 7th of September, when, having procured lodgings for the man in my neighbourhood, I summoned the gentlemen above named to assist me. The only other person present, except three men to hold down the patient, was my friend Mr Crooke.

Operation.—The operation may be divided into two parts.

The first consisted in tying the common carotid artery, the second in extirpating the tumour.

The man being laid on his back on a firm cot, and his chin turned to the left side, an incision was made along the internal margin of the *sterno-cleido mastoideus*, commencing from a point on a line with the middle of the thyroid cartilage, and extending to near the sternal extremity of the clavicle. The fibres of the *platysma myoides* were next cut through, and I proceeded cautiously to dissect through the cellular substance to find the sheath of the artery. This part of the operation was rendered very embarrassing by the quantity of blood, both venous and arterial, that flowed at each touch of the knife, for as fast as it was sponged, the wound was filled up again with blood. As the bleeding continued, notwithstanding five small arteries had been tied, by the advice of Dr Hornbeck, I enlarged the incision backwards towards the tumour. This was a circumstance of little moment, as this incision would have been necessary, at all events, in the subsequent operation. This gave me more room; and by waiting patiently for a short time, the wound was so far cleared of blood, as to allow me to distinguish the sheath of the carotid artery, with the *descendens noni* on its anterior part. The artery lay very deep, so that after repeated attempts to cut open the sheath, I was obliged to make the man sit up. On turning his chin to the left side, the artery now became much more superficial; and I was easily enabled to open the sheath, by pinching up a part of it with the forceps, and dividing it, by cutting with the knife laid flat. Having passed the common aneurismal needle, armed with one stout well-waxed silk thread, closely round the artery, and having satisfied the gentlemen in attendance that there was nothing but the artery included, I drew the ligature firmly and strongly. The pulsation immediately ceased in the upper portion of the artery, which I could distinctly feel through its sheath for at least a third of an inch above the place where it was tied. The internal jugular vein gave me not the least embarrassment, nor did I even see it during the operation. The artery was tied at a point about a line opposite to the middle of the thyroid cartilage.

This first operation lasted fifty-five minutes, and would probably have been concluded in half the time, but for the embarrassment caused by the superabundant flow of blood.

The patient was now allowed to rest for a quarter of an hour. A cup of chicken-soup, and a wine-glass of a cordial mixture, composed of tincture of lavender, essence of peppermint, &c. were given him.

The patient being again fixed in a recumbent position, I proceeded to extirpate the tumour.

An incision was made from behind the *concha* of the ear to the termination of the tumour in the neck. I next dissected the skin from the tumour until I had arrived near its base. An oval incision was then made on the front part of the tumour, extending from the front of the ear to the termination of the first incision. I was unable to save so much skin as I had wished, from its being tuberculated, and of a suspicious appearance. The tumour was dissected out cautiously on this side also. Notwithstanding the ligature of the common carotid artery, several arteries sprung in the course of the dissection, so that I had altogether to tie seven in this part of the operation. The tip of the ear, and the cartilage above, were now dissected out of the tumour, which was dissected alternately on each side, until it hung by a portion not thicker than the middle finger, deep under the angle of the jaw. Upon attempting to cut this, a considerable artery jetted out its blood. Drs Hornbeck and Ravn having thrown two ligatures round this part, I boldly cut it away, and had the satisfaction to find that no hemorrhage followed. A small lymphatic gland, about the size of a bean, being a little hard, was seized with the hook and extirpated. The whole of the space that had been occupied by the tumour was now carefully searched by the attendant physicians and myself, and no diseased portion could be detected. In the course of the dissection, I was obliged to cut away a part of the head of the sterno-mastoid muscle, as it was impossible to separate them.

The wound that was exhibited after the removal of the tumour, including the one made for tying the carotid artery, extended from the mastoid process of the temporal bone to near the sternal extremity of the clavicle, and from the front part of the ears to deep under the jaw, near the angle of the mouth. The lips of the wound from the sternal extremity, to the angle where the two incisions round the tumour met below the jaw, were brought together by the interrupted suture.

The upper wound, where the tumour was situate, could not be closed by the skin, as a large portion had been cut off for its unsoundness. This space was therefore covered with adhesive strap, and allowed to granulate.

Slips of adhesive plaster were put between the stitches on the wound on the neck, and the whole being covered with a layer of charpie, a loose roller was passed round the neck, and over the top of the head.

The second operation lasted about forty-eight minutes. The patient did not lose above fifteen ounces of blood; he was not the least exhausted; and at the conclusion of the operation, I found his pulse exactly 96.

He bore this formidable operation with amazing fortitude, and scarcely uttered a groan the whole time. The tumour on being cut into was found to be of the true scirrhous character. It weighed ℔ j. 12℥. The summit was ulcerated, and one of the lobes at the base contained fetid purulent fluid.

As it is needless to give a long detail of the progress of the cure, the following notes may be deemed sufficient. In three hours after the operation the pulse rose to 100.

Five hours after the operation it sunk to 84.

Sept. 8th. The patient passed a tranquil night. At 6 A. M. pulse 84.

Half-past 1 P. M. Complained of a suffocating sensation, with difficulty of deglutition, which appeared to have been produced by the tightness of the dressings round the neck, for on removing the bandages he experienced immediate relief. Another roller was applied loosely round the neck, the first being clotted with venous blood and matter. 6 P. M. Lies perfectly quiet. Pulse 84, skin cool. He takes slight nourishment, such as salop, in small quantities. 8 P. M. Pulse 96; complains of a tickling cough, for which let him keep a little of the *Pate pectorale de Regnault* in his mouth to allay irritation.

Sept. 9th. Passed a good day; cough allayed.

Sept. 10th. Passed a good night; is tranquil; pulse 80. At half-past one P. M. the whole of the dressings were removed, when it was found that the wound on the neck had healed from the lower part up to the last ligature in the skin. The upper part of the wound, where the tumours had been situate, was much contracted, and the granulations were natural.

Sept. 12th. From this period the wound was dressed daily; the patient was kept on a very low diet, nothing being allowed him but a little sago, salop, or gruel.

Oct. 3d. The patient has been daily gaining ground; to-day the ligature on the carotid came away, all the other ligaments having previously come away in the several dressings.

Oct. 6th. Dismissed perfectly cured.

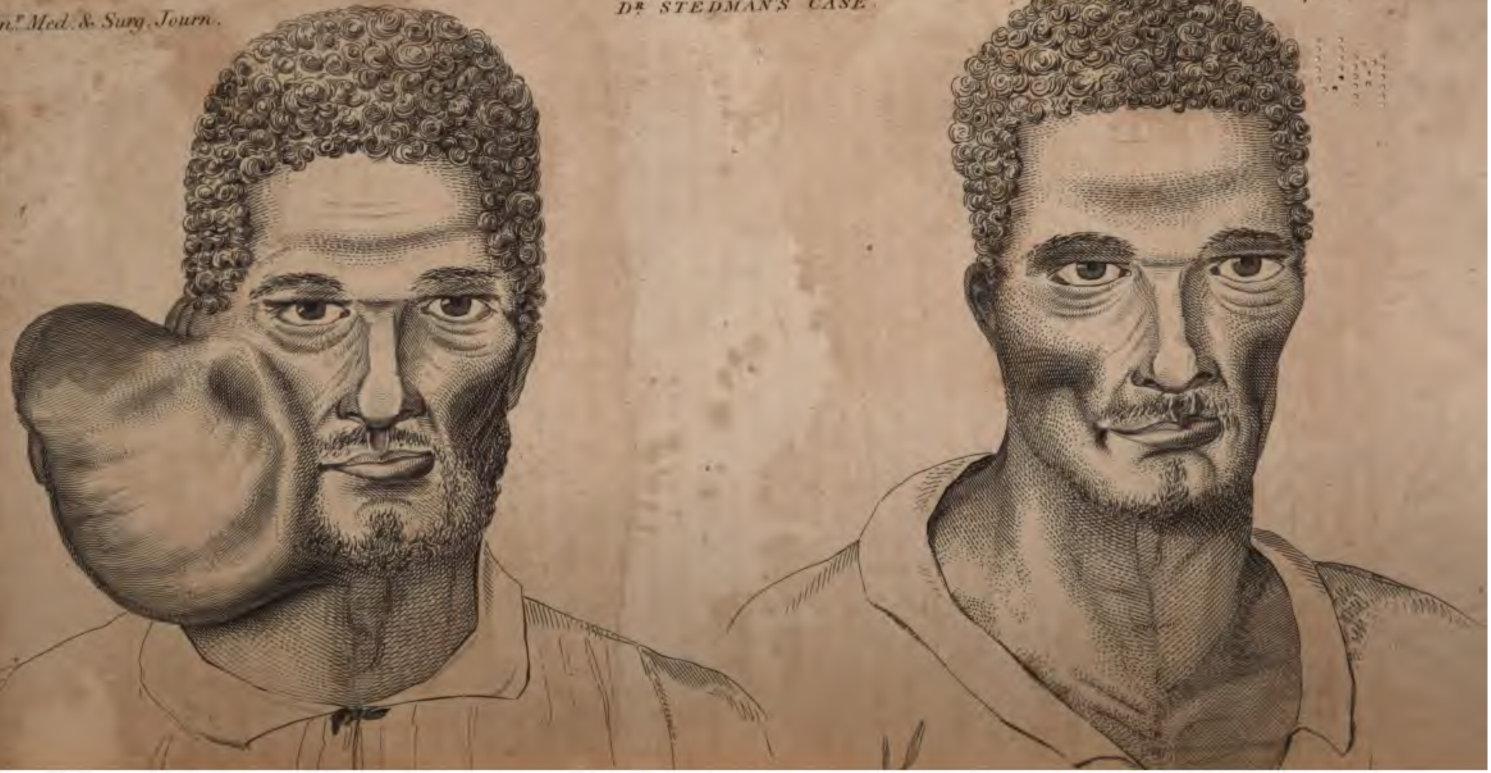
Remarks.—The two sketches prefixed represent the patient with the tumour, and when cured. It will be observed that there is a slight contraction of the mouth to the left side. There was something of this before the tumour was removed, but it has somewhat increased since; probably owing to the labial branch of the *Pes anserinus* being cut in the operation.

There has been some dispute among authors whether the common carotid artery should be tied in operations similar to this one. I think this case clearly demonstrates the propriety

Edinr Med. & Surg. Journ.

Dr STEDMAN'S CASE

p. 24. Vol. XXXVII



of the measure, not only from its saving an useless and even dangerous effusion of blood, but also as tending to diminish the local inflammation.

I quite agree with that eminent surgeon, Mr Colles of Dublin, in thinking that it is impossible to extirpate the parotid gland *, and that those cases in which the parotid gland was said to be extirpated, were nothing more than cases of diseased enlargement of lymphatic glands, whose increased volume had occupied the position of the parotid on the cheek, causing the parotid absorption of that gland.

That such was the case in this instance, I am convinced by the oval and well-defined base of the tumour, so different from the ragged and multitudinous adhesion of the parotid gland.

I have only to add in conclusion, that it is now nearly a year since the operation, and that John Sensire has continued to enjoy uninterrupted health ever since; that his shirt collar covers the scar of the wound on the neck, and his whisker the greater part of that on his cheek. He still continues his old occupation of a boatman in this harbour.

St Thomas, September 4th 1831.

Case 2.—*A large scirrhous Tumour successfully extirpated from the right Labium Pudendi.*

In April 1831 I was consulted by a coloured woman for a tumour attached to the right *labium pudendi.*

It had been growing for five years, and extended the whole length of the right *labium pudendi.* It had given her a sort of stinging pain, and produced such inconvenience in walking, that she was resolved to suffer anything to get rid of it. Ulceration had latterly taken place on the anterior part, discharging a very fetid matter; and the patient was a good deal reduced.

Assisted by Dr Milliken, now of St Kitts, and Mr Crooke, I performed the operation on the 22d of April.

Placing the woman in the position used in lithotomy, but without tying her hands or feet, as she was held firm by three assistants, I made a semilunar incision rapidly along the base of the tumour on the vaginal aspect. I next made a similar incision on the external base of the tumour, including some of the hair of the part. The tumour was now rapidly dissected out, and the operation was finished in less than one minute. Four small arterial branches were now tied, and having ascertained that no particle of the tumour remained behind, I brought the wound together by five stitches of interrupted suture.

---

* See a Treatise on Surgical Anatomy, Part the First, by A. Colles, one of the Professors of Anatomy and Surgery in the Royal College of Surgeons in Ireland, pp. 134, 5, 6. Dublin, 1811.

The opposite faces of the wound fitted each other most accurately, and formed a line along the remains of the labium.

The tumour is now in my museum, and being measured, was found to be 12½ inches in circumference at the broadest part facing the vagina. It projected 3 inches in perpendicular height from the orifice of the vagina. It weighed 12½ ounces, and being cut into exhibited the true scirrhous character.

The wound healed kindly, and the woman was perfectly cured by the 18th of May.

She has since enjoyed uninterrupted health, and has become much fatter and stouter.

CASE 3.—*A case attended with some singular circumstances, in which the Operation for Imperforate Vagina was successfully performed.*

I was called on June 6th 1831, to see a negro girl 16 years of age, a slave of M. Huart of this island. I found her labouring under a strange complication of diseases. The anus was much bruised, and there were extensive excoriations on each side of it, extending to near the situation of the fourchette of the *vagina*. The *labia pudendi* were small, and the left somewhat excoriated.

Between the *labia* there was no fissure whatever, except near the orifice of the *urethra*, where there was a small round hole about the size of a large pin's head. The *vagina* was entirely closed, nor was there the slightest vestige of an opening, and only a very indistinct line where such opening should naturally be. It appeared to be closed by a thick and firm substance covered with skin resembling the other parts of the body. The hole by which the urine passed was soon a good deal enlarged by ulceration, which enabled me to introduce the female catheter, an operation found necessary on the second day of my attendance from retention of urine. On this occasion I drew off a large quantity of fluid of an urinous smell and mixed with a thin reddish fluid that appeared to be the menstrual discharge. I was confirmed in my opinion that the urine was mixed with the menstrual fluid, for when I depressed the catheter nearly in a perpendicular direction behind the septum which closed the vagina, a large quantity of fluid of a more distinctly red appearance issued.

I introduced the catheter several times to draw off the urine, and on the three or four first occasions it was mixed with a similar red fluid. Afterwards the urine came away unmixed through the catheter. One of the attendants learned to introduce the catheter, and thus saved me the trouble. After a few days, as the irritation and inflammation of the neighbouring parts diminished, catheterism became unnecessary.

For some time before the operation, the hole through which the urine came ceased to be ulcerated, and contracted to about the size of a large pin's head, so that the catheter could not be introduced.

I treated the sores about the anus in the following manner. The bowels were kept gently open by small and repeated doses of cold-drawn castor oil. Bread and milk poultices were applied for a few days at the beginning, until the sores began to assume a healthy appearance.

The irritation had been kept up previous to my being called in, by an ointment composed of lard and red precipitate. This of course was discontinued. The patient was put under a gentle course of mercury until the gums were slightly affected, when a little of the decoction of sarsaparilla was given. As the appetite was deficient, the sarsaparilla was succeeded by drinks composed of a slightly bitter infusion of gentian root in cold water. These entirely restored the tone of the stomach.

After continuing the poultices for some days, the sores were washed first with a lotion composed of tincture of myrrh and water, pledgets of lint spread with fatty ointment being applied after each ablution. The entire healing of the sores was completed with the chloride of lime-wash, composed of gr. iv. of the chloride of lime to ℥i. of water mixed with a little rose-water. Every thing being now prepared, I proceeded to the operation for opening the vagina on the 20th of July. I was assisted by my friends Baron Von Bretton, M. D., Dr Ravn, deputy king's physician, and Mr Crooke. There were present besides, M. Huart, and Elias Levy, Esq.

Operation.—The patient was placed on a table in the recumbent posture, a servant sitting behind her and supporting her shoulders. She was held fast in the position used in the operation of lithotomy by the gentlemen present.

Having previously ascertained by examination by the finger *per anum*, that there was no connection between the vagina and rectum, I introduced with some difficulty, a small grooved conductor, in a perpendicular direction, through the small hole abovementioned.

With a small sharp scalpel I then made three rapid incisions of what I judged the requisite length, through the septum and upon the director. The incisions completely divided the septum, which was about a quarter of an inch in thickness, and of a membrano-ligamentous structure. The finger being introduced, the interior of the vagina was found natural in its structure. Of this the medical gentlemen present satisfied themselves.

Scarcely half an ounce of blood was lost, and the operation was completed in about half a minute. A piece of lint steeped in olive oil was introduced on the fore-finger between the lips of the wound into the vagina; a compress of lint was applied, and the whole kept in its place by a T bandage. The patient struggled a good deal during the operation.

In the evening I found the patient doing well. The female catheter was introduced by way of precaution, in case the consequent inflammation should close up the orifice of the urethra, and it was fixed by a string to the bandage round the waist.

A similar plan was pursued at each dressing, and the patient is now perfectly recovered, having a vagina of a natural appearance.

Remarks.—The want of the orifice of the vagina was discovered previous to my attendance by the people employed to dress the sores about *the anus.* These sores were caused by a *coitus nefandus*, with a negro man, who could not afterwards be discovered. He probably had no intention of committing so grave a crime, but finding the entrance deficient in the usual place, had probably in the heat of passion proceeded to the violence which occasioned the excoriations.

As to the origin of the closure of the vagina, I have no doubt that it took place when the girl was an infant, and that it was caused by excoriations and subsequent union between the nymphæ. This being neglected, had in the course of years formed the complete *septum* which I have described. I am confirmed in this opinion from the circumstance, that I was called sometime ago to see a similar case in a female mulatto two years of age, in which, from excoriations, the nymphæ were *beginning to adhere.* The mother, being an intelligent woman, called in medical aid in time, and the adhesions, though extending along the whole orifice of the vagina being slight, I was easily enabled to separate them by the introduction of a silver probe.

The parts were afterwards kept from adhering by pledgets of lint dipped in a weak solution of alum in water.

St Thomas, Sept. 4th 1831.

ART. III.—*History of the Scarlet Fever, as it appeared in the Island of St Bartholomew, in the years* 1829 *and* 1830, *tending to show that the Dandy is merely a modification of this disease.* By W. H. COCK, M. D.

THE meteorological constitution of the island of St Bartholomew presented, during the winter of 1829–30, certain features, which, if not peculiar, exerted at least a remarkable influence on the character of the diseases of that season. I could generally trace a remarkable connection between the state of the weather and the symptoms of several of my patients; and I believe, therefore, that the temperature of the season had considerable influence in modifying the scarlet fever of that year, and to give it a rheumatic character so distinct as to show its close connection with the dandy epidemic of 1827.

Meteorological Observations.—The winds which are the most unpleasant to the feelings of the Creole, and to those of the Europeans who have long resided in this part of the West Indies, and which bring with them a train of diseases, such as colds, coughs, rheumatisms, bilious fevers, and a variety of inflammatory ailments, blow from the north and north east, and generally prevail in the winter months. To a person just from Europe these winds are pleasant and agreeable; but to those who have been long subject to the relaxing influence of a tropical sun they are chill and piercing. These winds prevail generally in the evening, and continue during the night. A few hours previous to their blowing, you are breathing an atmosphere of from 80 to 90 degrees; but no sooner do they prevail, than this is suddenly reduced several degrees, and the perspiration, which was before flowing freely from every pore of the body, becomes suddenly suppressed; and if the powers of the system are not equal to produce reaction, by increasing the tone and action of the cutaneous vessels, and thus re-establishing the balance of the circulation, congestions in the circulating system are the consequences, and disease necessarily follows. The baneful influence of these winds on the tropical constitution is not perhaps solely owing to their lower degree of temperature than that of the regular prevailing winds, but probably also to their being loaded with morbific *miasmata*, wafted from the American Continent. In the months of December and January the winds were frequently from the north and north-east, and prevailed generally in the evenings and during the night, which were in consequence chilling, and rendered often more perceptibly so by the great heat which sometimes existed during the day. During these months colds, coughs, and sore throats were very common. Scarlet fever likewise existed in a few families, and in some cases assumed its most malignant form. The month of February, besides being chilled by the same winds which prevailed in the preceding months, was dry and very changeable. There were many cases of chicken-pox and sore-throat without scarlet eruption. The inflammation in these cases was slight, but was long in subsiding. There were likewise cases of the anginose and malignant scarlet fever. The weather in the month of March was more moderate, and the cases of the scarlet fever were milder, but accompanied with rheumatic symptoms; the chicken-pox still continued to prevail. The month of April was very unpleasant, with the wind often from the north; and on the 23d, 25th, 26th, there fell a great deal of heavy rain. The cases of scarlet fever in this month were very severe, and associated with violent rheumatic symptoms, which were present in the cases of the malignant as well as in those of the anginose species. In May, where there were frequent showers, with north-easterly wind, many of the cases of scarlet fever were still distinguished by rheumatic symptoms. The seventh and a few of the succeeding days were sultry and oppressive, and cases of asthma and of a disease resembling *bronchitis* were prevalent.

These cases were distinguished by the following symptoms. The child became suddenly pale, languid, and oppressed,—was seized with great difficulty of breathing, accompanied with much heaving of the chest, with considerable mucous rattle, and with pain at the *scrobiculus cordis.* The face was somewhat swollen, the bowels were constipated, and the surface of the body was bedewed with a cool clammy sweat; the pulse was oppressed, and slight symptoms of stupor prevailed. The capillary vessels of the cutaneous system had lost their action; there was a general reflux of the blood to the internal organs, in all of which congestion had taken place; but these were more apparent in the lungs and bronchial tubes, and threatened, unless speedily relieved, a fatal termination. To restore, therefore, the balance of the circulation, became the immediate duty of the physician; and the following were the means which I adopted for this purpose, and invariably with success.

A large dose of calomel was immediately administered; the bowels were opened by injections of assafœtida dissolved in warm water; and the patient was immersed in a warm bath, and retained there until warmth of the surface and perspiration were induced. After immersion in the bath for ten minutes, the skin generally became warm and perspirable, the bowels were rendered solvent, and the pulse more full and free. The symptoms from that moment generally declined, and at the end of twenty-four hours from the attack the patient was perfectly restored. In very severe cases the calomel was repeated after the bath every two hours; a blister was placed between the shoulders, and the injections were frequently repeated. From the severity of the symptoms, and difficulty of breathing, if relief be not speedily obtained, death would, I am persuaded, ensue in less than twenty-four hours from the attack. My brother-in-law lost a little negro on his estate in St Christopher within that period. No fatal case occurred in my practice.

The month of June was ushered in with heavy rains; the evenings were chill, and the days frequently very hot and sultry. The weather throughout the month was very variable. Rheumatisms, colds, and coughs prevailed, and the cases of scarlet fever were accompanied with violent rheumatic symptoms.

A variety of interesting conclusions might be deduced from the above observations; but as they probably might be considered more speculative than practical, I shall leave each reader to draw his own deductions, and shall now proceed to describe, in a concise manner, the appearance of the disease, and the treatment which I pursued in it.

The first case of scarlet fever which I saw was on the 2d of December 1829. This I believe to have been the earliest instance of that disease, as I am not aware of any other having previously come under the notice of the medical men of this place. It occurred in a little girl from 6 to 7 years of age, was exceedingly mild, and attended with little, if any, soreness of throat. Several members of the same family were attacked, but in a much more violent manner. The disease in them assumed the anginose character. Thence it soon extended to a neighbouring family, whose friendly attentions were repaid by one of its severest visitations.

The mother of four children having visited a young lady who was labouring under the disease, was speedily affected herself, and was the means of communicating it to the members of her family. Her case was mild; that of her family very severe; and three of her children exhibited specimens of the disease in its most malignant form, and one fell a victim to it. It never became epidemic, but continued until the end of June, creeping gradually from one family to another. It seldom existed in more than one house at a time, and its source could always be traced to a communication with the infected. The fever was believed to be imported from America by a lady who arrived here with her children, who were attacked on board with it; and it appeared first in the family in which she lodged during her stay in this island. She left this for Montserrat, where I understand the disease broke out soon after her arrival.

The greatest proportion of cases were of the anginose and malignant species; but both forms were distinguished by being accompanied with, or complicated by, rheumatic pains of such singular severity as to make some approach to the fever formerly described under the name of Dandy; and on these I now propose to make some observations.

Section 1.—*Species Anginosa.*

The attack of this variety commenced in different ways,—in some with sickness of stomach, followed by vomiting, or with slight rigors, uneasy aching sensations in the limbs, and slight difficulty in swallowing; in others with violent pains of the head, back, and limbs, and of the joints of the toes and fingers, accompanied with burning sensations in the eyes. The headach and pains of the back and limbs were symptoms which were observed by Huxham to announce the attack of the fever which he saw in 1751 and 1752. To these introductory symptoms succeeded fever, with sometimes an increase of pain in the head, with flushed face, and occasionally burning in the eyes, with an ardent condition of the skin; a quick and generally small pulse, and towards evening *delirium*, with restlessness, or a degree of *stupor*. On the second or third day generally, but sometimes on the first, the skin was covered with a scarlet efflorescence, which first appeared on the breast, and afterwards on the other parts of the body, brighter at one period of the day than another. The throat at the same time was complained of, and on inspection the *fauces* were found much inflamed, the tonsils swelled and studded with white specks. The tongue suffered from inflammation, was sometimes much swollen, and covered generally with a white yellowish or brown crust, through which appeared a number of *papillæ*, which were red, and considerably erected. The sides and under surface of the tongue were frequently ulcerated, and in one case these ulcerations were accompanied with a purple appearance of that organ, as if congestion had taken place in the veins. In general, the difficulty of swallowing was not in proportion to the inflamed and diseased state of the mouth and *fauces*, but in a few cases deglutition was performed with great difficulty, and a portion of the drink was frequently ejected through the nostrils. The sloughs generally began to separate about the fifth or sixth day from the commencement of the eruption, but in a few cases the separation was not effected until a much later period of the disease.

The eruption exhibited considerable variety in its shades of colour, in the time of its fading and reappearing during the day, in its extent, and in the period of its decline. In one case it was confined to the face, and to the course of the *biceps* muscle of the right arm, and was accompanied with great pain of the head, burning in the eyes, and symptoms of high phlogistic action. In another case, the eruption was of a fiery red, covering the whole body, was accompanied with great itching, and terminated in several parts of the body in small confluent psydracious pustules. These were most numerous over the *os sacrum* and under the chin. There were likewise some large watery blisters about the instep. The patient was corpulent, and of a gross habit. The eruption in general declined about the fifth day, when it was followed by desquamation; but it often happened that desquamation did not commence until some period after the declining of the eruption. The pains of the head, back, wrists, elbows, and knees, and of the joints of the toes and fingers, frequently existed throughout the whole course of some of the cases, and were generally much aggravated in the night; but they prevailed most commonly on the fading of the eruption, and were accompanied with soreness of the skin, and often with distressing itching. They resembled in every respect those pains which characterized the fever of 1827, and like them would subside for a short time to return with redoubled violence. These cases were most frequent in the months of March, April, May, and June; and, as I shall afterwards attempt to prove, *establish* the identity of scarlet fever and the fever of 1827.

Occasional coldness in this description of cases was frequently complained of, although the heat of the surface was much above the natural standard. A lady of sanguine temperament and somewhat corpulent, and the mother of ten children, at a certain hour every day experienced a sensation of coldness, extending from the fingers to the elbow, and from the toes to the knees, which was followed by fever, with considerable pain in the joints. Some, together with pains in other parts of the body, suffered much inconvenience from a sensation of fulness and distension of the fingers, and from inability to move them. A thin ichor, which trickled from the nostrils, and a continued lacrymation, increased the sufferings of many. Considerable irritability of the stomach, which sometimes depended on the presence of a worm in that viscus, but often on morbid sensibility of the organ, which rejected everything that was swallowed, were symptoms of frequent occurrence. Worms were frequently passed in this fever; and in some cases from the violent irritation which they occasioned in the bowels, and from their great number, endangered much the safety of the patient.

The convalescence was in general protracted, and some time was required to restore health; in some cases it was rendered tedious by inflammation of the glands of the neck, accompanied with much swelling, which advanced but slowly to its termination in suppuration; but diarrhœa never occurred in any case which came under my notice. In some cases their was much pruritus, with an eruption resembling *urticaria;* and I saw one case of a little girl, who, when recovering from the disease of scarlet fever, was attacked with the chicken-pox*, which was prevailing at the time in some parts of the country to which the contagion of scarlet fever had not yet extended.

---

* In this island the small-pox has not been known to have existed for many years, and very few of the younger portion of the population have ever had that disease; yet the chicken-pox has not been uncommon, and most of the children who at this

Such are the most remarkable symptoms which attended the cases of *scarlatina anginosa*. Many of them were very severe, and required every attention both from the nurses and medical attendant, but did not afford those humiliating exhibitions of suffering which distinguished the cases of the *scarlatina maligna*, which now claims attention.

Section 2.—Scarlatina Maligna.

This species was regularly ushered in by vomiting, with paleness and depression of countenance, with great languor and debility, and sometimes with pains in the bowels; much drowsiness frequently attended these premonitory symptoms, and terminated in one case a few hours after the attack in stupor, from which nothing could rouse the patient. Convulsions formed another introductory symptom, which in one case were so violent and so frequently repeated that death was dreaded during the severity of the paroxysms. These cases were distinguished from the very commencement by low muttering *delirium*, from which, however, the patients could be roused by raising them and speaking to them. The throat, early in the disease, exhibited signs of inflammation, and generally on the first day the tonsils and the *velum pendulum palati* were red and streaked with purplish lines, which ran along these parts to the sides of the tongue and to the back of the *fauces*. These surfaces soon became spotted with a number of white specks, which covered likewise the sides of the mouth, inside of the lips and gums: the colour of these, from white or cineritious, changed into a dark brown or black, and a thick viscid mucus covered the upper surface of the tongue, which in the progress of the case became dry and black. The tongue being quite rigid and cracked, exhibited an appearance as if divided in different directions by some cutting instrument. The teeth were coated with a black incrustation, the lips were parched and wrinkled, which was occasioned no doubt by the hot and pestilential air which was constantly passing over them from the lungs. The nostrils discharged a most fetid ichor, and the breath was in the highest degree offensive. The eyes were heavy and watery, and in one case swollen and attacked with ulceration; the ears were also

---

period had the disease had never suffered from small-pox, and some had not even been vaccinated. That chicken-pox is a distinct disease from small-pox, I have never had any doubt; and I think this point, if it was not fully settled by the reviewer of Dr Thomson's work in the Edinburgh Medical and Surgical Journal, has been so by the arguments of Drs Lüders and Mohl.

affected, and discharged a fetid matter. The respiration was difficult and sonorous, and accompanied (to use the words of Dr Huxham) with a kind of *rattling stertor*, as if the patient was actually strangling, the voice being exceedingly hoarse and hollow, exactly resembling that from venereal ulcers in the *fauces*. The neck and face were in some much swollen, and the head in all was drawn backwards. The sloughs of the throat and mouth continued from thirteen to twenty days from the commencement of the disease before they separated, and the mouth remained sore and tender for some time longer.

The eruption, which appeared commonly on the third day, was very different from that in the *scarlatina anginosa*. It was of a dull red or purplish colour, interrupted with white patches; and it disappeared almost entirely at different periods of the day, leaving the skin of a dirty yellow hue. In some it was very partial, being confined to the neck and under part of the chin, and to the elbows and knees, and resembled in tint the first invasion of the *erysipelas gangrenosum*. On the fifth or sixth day little eruption could be perceived; but desquamation was frequently not established on the twentieth day. The skin remained dry, and without action for a long time; and in one case, on the forty-fifth day from the commencement of the attack, the perspiration was slight and partial, and the skin from the legs was separating in fine powder.

The pulse during the whole course of the disease was small, weak, and accelerated; and the extremities were frequently cold. Worms were often discharged, and in many cases diminished considerably the chances of recovery. A tedious and protracted convalescence attended the recovery from this formidable pestilence; and so powerfully was the constitutional energy repressed, that for months the complexion remained pale, the strength inconsiderable, with anasarcous swellings of the extremities, and little if any exertion was made to restore health.

Section 3.—Treatment.

The first remedy to which I advert is venesection, a most powerful means of restraining that state of febrile action, which consists in violent and ill-directed efforts to eject suddenly into the venous system a larger quantity of blood than it is prepared to receive, by which means the balance of the circulation is destroyed, and congestions are produced in various organs, whose functions thus become interrupted or entirely suspended, and that functional integrity, which is necessary to the existence of the vital principle, is threatened with destruction. The degree of this action varies in different cases, and is regulated by the intensity of the cause from which it originates, and by the powers of the system. Where the cause, being a contagious miasm, is intense, and the powers of the system weak, its sedative influence is so powerful as in general to impair or prevent reaction; but when the cause is intense and the powers of the system vigorous, the reaction is generally in proportion to its intensity. In the first instance, the depressed powers of the system require to be invigorated by cordials, stimulants, and epispastics, to secure that reaction which is necessary to a full developement of the disease, and without which a return to healthy action cannot be expected. In the second, depletory measures became necessary to restrain that violent arterial excitement, which, by subverting the harmony of action necessary to the due performance of the living functions, would terminate either in mortal exhaustion, or in such derangement of the functions of some essential organ as would lead to its disorganization.

From these observations it follows that venesection is only necessary when the disease is attended with violent arterial action,—in other words, when the pulse is full and strong, or oppressed, the heat considerable, and there exist evident local congestions, evinced by violent pain in the head or some other part. But as there are other means of reducing action and of removing local determinations besides venesection, this should be employed in this disease only when we are certain by it to produce a powerful impression on the complaint, and an immediate abatement of some of the most violent symptoms. For if it be not attended with immediate benefit, it only occasions a hurtful waste of strength, which renders the future course of the disease more dangerous. But in order to insure advantage from blood-letting, the blood should be permitted to flow until considerable relief is felt in the symptoms for which it was indicated. I know no other measure of the quantity of blood to be drawn than the effects produced during its abstraction, which should be carefully watched; and I know of no practice more revolting to common sense, and more injurious, and which, I am sorry to say, still prevails, than that of ordering a certain quantity of blood to be abstracted in any individual case. By what means are we to know that the quantity which we have ordered to be drawn will produce the effect which we wish, or that it will not be too great; and if it do not produce the desired effect, what advantage is gained? None; but the patient is placed in a worse condition than before the bleeding. The symptoms still exist, but the resources of the system have been wantonly reduced; and if a quantity greater than that what is necessary be abstracted, can any man in his senses assert that he has acted properly towards his patient? "No; we know that we have no certain rule by which we could regulate the quantity which ought to have been drawn; it was therefore our duty to be present when the operation was performed, and to have allowed the effects to regulate the quantity. We are likewise aware that drawing blood from a small or enlarged orifice produces very different effects on the system, and are there no cases in which one mode may be more desirable than another, and if so, ought we to confide a matter of such importance to the judgment of any apothecary's boy? Away, then, with these pretensions to a knowledge which we cannot possess, and let this foolish practice, which, like many others which have long since been discarded, is a remnant of a barbarous age, disappear from among us."

Dr Armstrong, in his Treatise on Scarlet Fever, mentions that he has employed bleeding extensively in that disease, and justly observes, that one decisive evacuation of this sort is much more efficacious, as well as safe, than several repetitions of small ones. I have never blooded oftener than once in any case of this disease, and never but when I was certain of producing by this operation a powerful effect on it.

The following case will illustrate the benefit of this practice. A gentleman of about 30 years of age was attacked with high fever, accompanied with delirium at night; his face was much flushed, eyes red, and heat of skin considerable. He was exceedingly restless, complained of great pain of head, and of much difficulty of swallowing. The throat was much inflamed, tongue much swelled, of a purple colour, and ulcerated on the sides. The pulse was full and strong, but the eruption was partial, and confined principally to the neck and to the course of the *biceps* of the right arm. The symptoms in this case were such, that, if not quickly removed by prompt and decisive measures, they must have terminated either in mortification, or extensive sloughing of the *fauces* and internal parts of the mouth, or have destroyed the functions of the brain by effusion or some other termination of violent excitement. Bleeding, therefore, being calculated to produce the greatest effect in the shortest time, was immediately performed; and the blood was allowed to flow until relief was experienced in the pain of the head, the eyes becoming less fiery, the countenance pale, and the pulse soft and much slower. Before these effects were produced nearly a wash-hand basin of blood was abstracted. The bleeding was followed by a dose of twenty grains of calomel, to be followed by Epsom salts, an ounce of which was dissolved in a proportion of water, and one wine-glass ordered to be taken every half-hour until copious evacuations were obtained. I repeated my visit two hours after the bleeding, and found him sitting up in bed. He expressed himself quite relieved, his head free from pain, and the difficulty of swallowing much less. He had just then awakened from a sleep, into which he fell immediately after I had left him, and which was the first he had had since his attack. I found his skin disposed to moisture, and his pulse soft, and, in a word, there was every appearance of a speedy recovery. He was ordered an alum gargle for his throat, and to continue the use of purgative medicines. The swelling of the tongue rapidly diminished, and a few days from the time when I saw him, he was entirely free from every symptom, and able to move about. Blood-letting in this complaint, as well as in typhus, may be employed to cut short the disease.

A young gentleman was attacked with fever, pain in the head, uneasy sensation in the limbs, pain in the back, and sore throat; the pulse was full, and the skin warm ; in a word, the symptoms threatened a violent attack of scarlet fever. I was sent for immediately, and bled him until faintness was induced. This was followed by relief of the pain of the throat, by greater facility of deglutition, and by a copious perspiration. To secure these beneficial effects, a dose of calomel and jalap was administered two hours after the bleeding. This produced many copious evacuations and some vomiting, with much improvement of all the symptoms. As there still existed a slight affection of the throat, a tartar-emetic vomit was given on the following morning, and a dose of salts ordered to be taken the next day. On the third day he experienced little if any indisposition, had a good appetite, and was moving about. In this case the chain of diseased action was broken, and the most dangerous symptoms arrested by the bleeding, and were prevented from returning by the powerful purgative and emetic which were afterwards exhibited.

When it is our intention to cut short a disease, we must not be satisfied with the first favourable impression produced by any remedy which we may employ ; for as every disease consists in a regular series of actions which require a certain period for their full developement, there is always a disposition in the system to a renewal of these morbid actions, which will in general occur, unless the impression of the first remedy is kept up by either its repetition or the employment of other curative means. If bleeding be employed with this intention, it should be copious, and followed immediately by a powerful purgative, and by other means, as the nature of the case may require. In the *scarlatina maligna* the symptoms from the commencement do not encourage general bleeding; some advantage might, however, be obtained by the employment of leeches ; but as these animals can seldom be procured in the Islands, I cannot speak on this subject from my own experience.

The remedies which are next in importance to bleeding, and which are applicable to almost every variety of case, are emetics and purgatives.

Emetics are used both in the anginose and malignant species; and their operation, although it could not be said to shorten the period of the disease, yet alleviated many of the most distressing symptoms, by rendering the throat less stiff, by removing a quantity of thick slimy mucus which oppressed the stomach and filled the fauces and mouth, and by exciting the biliary secretions, and determining to the skin, and thus relieving that heat and oppression of the internal parts which frequently, by the anxiety and restlessness which they occasioned, formed the most insupportable part of the patient's sufferings.

In scarlet fever, the nature of the disease requires that the skin and fauces should be the principal seat of its developement; it will, however, often happen that these parts are but slightly affected, and the disease confines its ravages to some internal organ; in such cases emetics, with warm bathing and the prompt use of epispastics, offer the only securities of recovery to the patient.

After the most formidable symptoms of the disease were subdued, and convalescence was established, there frequently remained a slight degree of redness of the throat, with a foul tongue, which was probably an index of a disordered stomach, and accordingly were best removed by an emetic, the operation of which was protracted by drinking one or two cups of infusion of ipecacuanha root, and followed by a purge of calomel and jalap.

When vomiting occurred during the progress of the disease, and appeared to depend on an accumulation of slimy matter in the stomach, the vomiting was encouraged by drinking freely of chamomile tea. The best emetic for children, whether the disease be of the milder or more violent species, has appeared to me to be the ipecacuanha wine, to which are added a few grains of the sulphate of zinc, and for adults the tartar emetic, or thirty grains of the powder of ipecacuanha, with six or eight grains of the sulphate of zinc. The sulphate of zinc insures the operation of the emetic, and seems to produce a beneficial influence on the inflammation of the throat. Emetics, indeed, may be considered valuable remedies in this disease, but require to be assisted by the liberal use of purgative medicines, which may be employed in any stage of this distemper.

The valuable observations of Dr Hamilton in his work on Purgative Medicines, and of Dr Armstrong in his Treatise on Scarlet Fever, on the use of laxative medicines in that disease, preclude the necessity of my saying much on this subject. My experience has amply confirmed the remarks of those gentlemen;

and I have never witnessed in any case an increase of weakness which could be attributed to the exhibition of purgative medicines, or seen a single instance in which diarrhœa occurred, although I have attended cases of the disease which I have not found to be surpassed in malignancy by any histories of this complaint which I have read. The debility induced by the operation of a purge is very different from that which is occasioned by the oppressive actions of the disease, and is much more manageable. It is a debility which does not depend on a congestive condition of one or several organs, and on the suspension of this function, but is one which is the result of exhaustion, and is easily removed by a due regulation of stimulants. When it is possible, whatever may be the apparent debility of the patient, to turn entirely the current of diseased action by a powerful purgative, I should never hesitate to adopt such practice; and the debility which I should have to encounter, if it proved fatal, would prove so from wanton neglect or unpardonable ignorance on my part. It is not, however, often possible thus to storm the strongholds of the disease; but by cutting off its resources, and exhausting its forces by diverting them to other parts, we are able gradually to force it into a surrender. From no circumstance does the disease receive more powerful support than from an accumulation of feculent matter in the intestines, and from the daily increase of the morbid and acrid mucus which is secreted in the *fauces*, and is constantly descending into the stomach. The daily removal of these is necessary, and some gentle laxative, according to the circumstances of the case, should for this purpose be every day exhibited. But purgatives may be made to act on some large viscus, as the liver, and, by promoting its secretions, divert the tendency of arterial action from the *fauces* to that organ.

Equal benefit is not therefore to be expected from the employment of every purgative medicine. I have in this disease employed a variety of purgatives, but from none have I derived so much benefit as from calomel alone, or combined with jalap. In the anginose species of this disease, I used in the commencement a variety of laxative medicines, but I very soon observed that those cases in which calomel and jalap was the purgative, although equal to any in violence, were more speedily cured; and that its operation was always followed by a decided improvement of the state of the throat. The dose to an adult was fifteen grains of calomel and thirty grains of jalap. This dose frequently vomited, and when it did so, its influence on the condition of the fauces was much more considerable. The greater proportion of the benefit derived from this combination was no doubt due to the calomel, which exerts a powerful influence over the inflammation of mucous membranes; nor can I positively declare that calomel combined with any other medicine would not have had an equal effect; but I think that future experience will decide that the jalap forms, with the calomel, in this disease an eligible combination. In the anginose variety, I repeated the dose every other day as long as the symptoms of the throat continued violent, interposing on the intervening days a dose of rhubarb and magnesia, or of some other mild laxative. When the most violent symptoms of the disease were subdued, the bowels were kept open by a little rhubarb and bark, which soon restored the tone and the strength of the system. A distressing burning in the stomach was often complained of, which was generally easily removed by a little magnesia. In those cases accompanied with rheumatic symptoms, I employed calomel and jalap with considerable benefit. The malignant species of the disease seldom admitted of the use of strong doses of calomel and jalap, but the bowels were regularly kept loose by the use of a few grains of calomel and James's powder at night, followed the next morning by the use of an infusion of rhubarb and bark, flavoured with a little cinnamon. From this preparation much benefit resulted; it gently opened the bowels at the same time that it added to their tone, and strengthened the system. The evacuations were generally highly offensive.

Purgatives were serviceable during the protracted convalescence from the most violent forms of this disease, and none answered better than the above combination assisted by the use of a few grains of calomel two or three times a week.

With the free use of purgative medicines was united the frequent employment of injections, which were found advantageous in every variety, and at every period of the disease, and were more efficacious than any other remedy in removing those symptoms of restlessness and oppression which generally come on in the evening. They were, indeed, the best opiates, and their operation was frequently followed by a few hours sleep. In severe cases I ordered every evening from one to two; and the ingredients which entered into their formation were regulated according to the circumstances of the case. If the bowels had been freely opened during the day, and there was no tension or painful feeling of them, an injection of milk, sugar, and water was given; but if the evacuations had been scanty, or there were uneasy feelings present, one of warm sea-water was substituted; when nervous symptoms intervened, an infusion of assafœtida was employed. When the patient complained of painful tension of the abdomen, and of some difficulty of breathing, a turpentine glyster afforded the desired relief. Injections of bark, of arrow-root, and laudanum, were employed in cases of great depression and debility.

Epispastics.—To no class of remedies in the catalogue of the pharmacopœia is the physician more indebted for success, and affording relief to the sufferings of the patient, than those of the epispastic. By their means many a patient whose life has been despaired of has been rescued from the verge of the grave. In the scarlet fever I have found them of great service, and the only remedies to be depended upon in those cases where the eruption is tardy in making its appearance, and is preceded by convulsions and symptoms of a dangerous character. An illustration of this is found in the following case.

Thomas D——, a little boy of about two years of age, and of a delicate constitution, was attacked by vomiting and pains in the bowels, which was soon followed by convulsions. These were at first attributed to his having eaten a large quantity of raisins that day, many of which had been voided indigested; but as the fever, which was intense, did not abate after free evacuations had been produced by vomiting and purging, the belly being at the same time soft and free from pain on pressure, and the convulsions, notwithstanding the frequent use of the warm bath, injections of assafœtida, and the use of calomel and antispasmodics, continued to return every half hour with unabated violence, and to threaten a speedy termination to the existence of the little patient, I concluded, that, whatever share indigestion might have had in exciting the first attack of convulsions, their repetition could not be owing to that cause, but that they probably owed their recurrence to some latent eruption which might probably prove to be scarlet fever. I ordered a blister between the shoulders. Five hours after this application he had one fit, which was the last, and on the following morning the scarlet eruption appeared, with sore throat, and symptoms of a malignant nature. This case, which was one of distressing violence, and required five months to re-establish his health, would, had it not been for the timely application of a blister, have probably terminated fatally in twenty-four hours. I kept the blister open during the course of the disease; and I think great benefit was derived from that practice.

Many writers have condemned the use of blisters in malignant cases, from a fear of their being followed by mortification of the part. I have employed them in the worst cases of this disease, and cannot, from what I have seen, confirm such fears. I believe, that when mortification attacks the surface of a blister, an occurrence which I have never witnessed even in the most malignant cases, the case was desperate from the commencement, and would have been benefited by no remedy. In cases attended with symptoms of low muttering *delirium*, of oppressed and difficult breathing, with a dry, black, and parched condition of the mouth and *fauces*, the eyes and nostrils discharging a fetid ichor, and the tide of life being at its lowest ebb, I have seen great benefit follow the application of a blister between the shoulders, and have been gratified with an improvement of all the symptoms. The blisters in the worst cases should be washed with an infusion of bark, and dressed with the mildest applications. When there is much swelling of the *fauces*, and difficulty of swallowing, their application from ear to ear afforded speedy relief; and in running of the ears, I know no remedy better calculated to prevent the occurrence of deafness, which follows sometimes a discharge from these organs, than placing a *blister* behind each ear.

In the rheumatic species of this disease, the patient who has once experienced the benefit of a blister in such cases will gladly exchange the tortures which he endures for the severest smarting of the *cantharides*. The sufferings of the patients who are attacked with this variety are so excruciating that it is desirable to afford relief in the shortest possible time; but the action of the *cantharides* blister is too slow for this purpose, and is with advantage exchanged for the mustard cataplasm. The violent pains of the wrists, knees, and other joints, are much relieved by their application; and on the return of these pains, which will happen several times during the course of the disease, their reapplication is earnestly solicited by the patient.

The stomach sometimes is attacked with violent pain and vomiting, symptoms of a most dangerous character, which, if not speedily relieved, would soon terminate in death. In these cases relief is obtained by the application of a large mustard cataplasm to the pit of the stomach, the use of ether and laudanum, and stimulating the intestines by the frequent employment of assafœtida injections. These derangements of the stomach often depend upon translation of rheumatism to that organ; but pains and uneasy sensations are not unfrequently occasioned by swallowing of the acrid saliva and the putrid secretions which are so copiously supplied by the mouth and fauces. It becomes, therefore, our duty to remove such accumulations, and improve those secretions by the frequent use of gargles and other applications to the diseased parts.

Gargles.—The gargle which I employed in ordinary cases was composed of sage tea, alum, and honey, with a little lime juice. This I directed to be frequently used, and the sloughs to be occasionally touched with a hair pencil dipped in a mixture of honey, bark, and tincture of myrrh, and to wash out the mouth after each application with warm milk and water. In the malignant species I substituted for the sage tea gargle, one composed of a decoction of bark, port wine, and alum, which I found to answer much better than more stimulating ones. From the parched, ulcerated, and gangrenous condition of the mouth in the most violent forms of this disease, the patient was seldom able to gargle himself; and it was necessary to inject it into the fauces with a small syringe. These injections were frequently repeated, and after each repetition the ulcerated and gangrenous parts were touched with a mixture of bark and honey, which was washed out by injecting warm milk and water. Great benefit to the patient was derived from this practice; he was relieved from a quantity of thick slimy matter, which choked up the *faucês* and impeded his breathing; his tongue and lips, which were dry, parched, stiff, and hot, were supplied with moisture, and assumed after every washing a more natural appearance; his breath, which had been highly fetid and pestilential, became less disagreeable, and, in a word, his feelings were rendered more comfortable. I cannot agree with an observation of Dr Heberden, "that much stress should not be laid on cleaning the mouth;" for my experience has convinced me of the contrary; and I am fully convinced that I am indebted to my attention to that point for the success which attended my practice in cases which appeared of a desperate nature.

Colchicum.—Another remedy of equal importance with those which I have already mentioned, but which is particularly so in cases of this disease complicated with rheumatic symptoms, is *colchicum*. A tea-spoon of the wine was given at bed-time in a cup of tea, and was followed by relief of the tension and pain of the fingers, and of the severe rheumatic aching of the joints and limbs of many of the patients. It frequently purged, and when it did so it was not the less beneficial. It also generally determined to the skin, and was therefore of service at the close of the disease, whether rheumatic symptoms were present or not. When there is much irritability and uneasiness of stomach, it should not be employed.

Belladonna.—Having read some time ago in the Edinburgh Medical and Surgical Journal, (Vol. xxvi. p. 222,) the observations of Dr Randhahn on the efficacy of belladonna as a preventive against scarlet fever, I felt anxious to ascertain the value of his remarks; but the difficulty of obtaining any fresh preparation of this medicine prevented me from making any experiments on this subject until the 12th of April.

The scarlet fever having attacked an individual of a family consisting of seven or eight persons liable to the disease, I embraced that opportunity of trying what power it possessed in guarding the rest of the family from the contagion. I accordingly gave to each of those who had not yet suffered from the disease a pill of the extract of belladonna every night and every morning. The effects which were produced by the pills were similar in all; they slept well, perspired more freely than usual, and had a soft and full pulse. Only one of the seven, however, escaped an attack of the disease, and I cannot say that his exemption was due to the belladonna, or to a constitutional immunity. The disease, however, in the others, was not severe, and appeared certainly to have been modified by the use of that drug. It appeared to me, that, if it was useful as a preventive, it must be by keeping up a state of action of the system incompatible with the existence of scarlet fever, and that this action consisted in preserving a full and soft pulse, and a tendency to perspiration in the cutaneous vessels, and that, if such be the case, it ought to be not only useful in warding off an attack, but in subduing the disease when it already existed. I accordingly used it in several cases of scarlet fever, and in all with advantage; it induced sleep, rendered the pulse slower, and produced a perspirable condition of the surface, which is very desirable in this disease. I employed it in six cases, some of which threatened to be very violent; but they all terminated well, and in a short period.

In some it acted likewise as a purgative. Its value as a preventive or a remedy, should the disease occur in public schools, or any other public establishment where there are a number of individuals susceptible of its contagion, might easily be ascertained.

In private practice, opportunities for making such experiments do not often occur. I think, however, that it will be found more valuable as a remedy than as a prophylactic.

Miscellaneous remedies, diet, regimen, &c.—I have not employed the cold affusion in any cases of this disease; for there were none which I thought would have been much benefited by it; and in those cases accompanied with rheumatic symptoms, the impressions of cold air were so disagreeable to the feelings of the patients, that no advantage could have been expected from it. Sponging the feet, hands, and arms with cold vinegar and water was relished by some patients; but many experienced greater relief from sponging with warm water and vinegar. In swellings of the face, accompanied with soreness and an inflamed condition of the eyes, bathing with warm decoction of chamomile flowers afforded great relief. Warm bathing was a remedy of great use in those cases in which the disease seemed confined to the internal parts, and nothing soothed so much the feelings of itching, which was often the most distressing symptom of desquamation. During this stage a cup of wine-whey at night, to which from thirty to forty drops of hartshorn were added, encouraged perspiration, and quieted those restless feelings which tormented many at that period of the disease. The drinks generally employed were decoctions of gum arabic, orange-leaf tea, toast-water, or barley-water acidulated with vitriolic acid or cream of tartar; and these were not used indiscriminately, but regulated according to the circumstances of the case, and the inclinations of the patient.

The diet consisted of Indian arrow-root, sago, and other farinaceous substances. In cases of great debility, a little spiced wine and water, or an infusion of a roasted Seville orange in port wine and water, formed a very pleasant and useful remedy. When, during convalescence, there were much languor, emaciation and debility, with a hectic countenance, and frequent vomiting of a yellow offensive mucus, much benefit was derived from the use of gentle emetics, consisting of a little alum and sulphate of zinc, of small doses of calomel at night, and of a mixture of quinine given in small doses every two hours during the day. A strengthening plaster was likewise applied to the stomach; and an injection of Indian arrow-root, with a little laudanum, given every night. Country air and tepid sea water-baths every forenoon assisted much the effects of the above remedies.

Section 4.—*Comparison of the Fever with that of* 1827.

Having now considered the history and treatment employed in this fever, it remains for me to compare those cases which were complicated with rheumatic symptoms, with the disease of 1827, vulgarly distinguished in this part of the world by the name of the Dandy. Such a comparison will, I believe, establish the fact that the dandy was nothing more than a simple scarlet fever, which existed together with violent symptoms of rheumatism, and that that association of symptoms was the result of a peculiar and variable state of the atmosphere.

Every physician who is at all conversant with fevers is well aware that their type is in different years variously modified, and that they are combined according to the prevailing atmospherical constitution and local circumstances, with a variety of symptoms which do not essentially belong to them. Continued fever, for example, is frequently combined with symptoms which belong to other diseases, such as diarrhœa, cough, pleuritic affections, &c. Dr Bateman, in his Treatise on Contagious Fever, printed in 1818, page 67, mentions fourteen instances of fever united with severe inflammation of the tonsils and parotid glands, in two or three of which the parotid glands especially became prodigiously swollen, so as to render both deglutition and respiration difficult, and in one case appeared to occasion death by suffocation. Rheumatic pains and swellings are mentioned by the same author as occurring during the close of continued fever. These affected chiefly the feet, but sometimes the hands and shoulders, and were attended with great soreness, preventing the patient from moving about. These symptoms do not certainly belong to regular continued fever; but when associated with the symptoms which generally characterize that fever, they must be considered as accidental combinations, modifying, indeed, the treatment, but in no way changing the essential nature of the disease. If every variety of symptom which occurred in fever should induce us to consider the disease as a new malady, and entitled to a name and place in nosological arrangements, so various and diversified are those combinations, that a folio volume would not contain their designations. Every patient would require a new term for his disease, as it would be united with some symptoms which were not exactly associated in the same manner in any other case.

These observations in regard to continued fever apply with equal force to other fevers; and there is no more necessity for considering scarlet fever associated with rheumatic symptoms as a distinct disease, than there is of considering continued fever with such a combination of symptoms as forming a new and unheard of malady. That scarlet fever is sometimes combined with rheumatic symptoms is supported by the testimony of respectable writers. Dr Heberden, in his Commentaries, mentions, that in scarlet fever he has seen the limbs afflicted with rheumatic pains and swellings; and Dr Rush, in his essays on that fever, alludes to the case of a gentlewoman who complained of very acute pains in her limbs, resembling those of rheumatism. Dr Alexander Murray of Aberdeenshire, in an Essay on Scarlet Fever which is inserted in the Edinburgh Medical and Surgical Journal for 1821, page 343, uses the following words. "It was always long before perfect restoration to health took place, and very often after convalescence was begun, a painful affection of the joints, especially in the wrists and fingers, gave rise to a renewal of fever, and retarded recovery;" and in page 346, he says, "an affection of the joints was mentioned as not uncommon in the last stage of this disease. This was a swelling of the wrists and hands, less commonly a similar affection of the knee-joints and other articulations, attended with much pain and feeling of want of the power of motion."

In the fever which forms the subject of this essay, I have seen many such cases, and I shall now institute a comparison between these cases and the fever of 1827. The disease of 1827 was ushered in by shivering, pains in the head, back, limbs, and in the joints of the toes and fingers. These pains were violent, and, unless assuaged by treatment, continued until the appearance of the scarlet eruption, when they somewhat subsided, but returned again with redoubled violence during the stage of desquamation, accompanied often with distressing itching and soreness of the skin. Cold air was unpleasant to the feelings of the patient; and although the temperature of the surface was much above the usual standard, the patient would demand an addition to the bed-clothes. These symptoms were present in all the cases of the fever of 1827; and although a discriminating eye might easily observe the three stages of a simple scarlet fever, viz. the accessive, the eruptive, and desquamating, yet, from the extraordinary association of symptoms, there might appear some reason to consider the disease a new and distinct malady, unless a similar combination of symptoms were found to exist in cases which evidently originated from the contagion of scarlet fever, and exhibiting specimens of the more severe forms of that disease.

Now this combination actually occurred in the fever of 1829 and 1830. The symptoms of many of the cases of anginose scarlet fever resembled so closely those which characterize the fever of 1827, that they ought to convince every unprejudiced mind, that that disease was no more than a scarlet fever with peculiar symptoms. The cases of scarlet fever which were complicated with rheumatic symptoms commenced in general with nausea and vomiting, pains in the head and back, with aching of the limbs; the throat was swelled and much inflamed, and on the second and third day, when the eruption appeared, was covered with sloughs. On the declension of the eruption the patient was attacked with violent pains in the joints of the fingers, knees, toes, and wrists, with burning in the eyes, much headach in some cases, and pains in the back. In one case there was for some days an inability to raise one of the arms, and in many the fingers were swelled, and could not be bent. These pains were generally most severe in the evenings and during the night, when they deprived the patient of rest. The impression of cold air was much dreaded, and covering with the bed-clothes afforded some relief. An intolerable itching added much to the other sufferings of the patient. Whoever will take the pains to compare these symptoms with those detailed above of the fever of 1827, or with the description of Dr Stedman in his essay on that fever, (Edinburgh Medical and Surgical Journal, Vol. xxx. p. 277,) or with the accounts given by me in a letter which was published in the same Journal, (Vol. xxxiii. p. 43,) will find the resemblance so close as to remove from his mind all doubts with regard to the nature of that fever.

A few extracts from my note-book of cases of this variety of fever may serve to illustrate these remarks, and render the comparison more easy.

The first case which I shall extract is that of Mrs Dwyer, a woman between 30 and 40 years of age. She was attacked on the 22d of April with sickness of stomach, some shivering, with headach, pains in the back and joints, burning in the eyes and flushed face. There is much fever, and some inflammation of the throat; complains frequently of chillness, although the skin is very hot to the touch. She has been taking the belladonna pills.

Wind from the north.

Treatment.—Let her have an emetic, and in the evening a belladonna pill. To be sponged frequently with warm vinegar and water.

April 23d. Wind still northerly; some rain. The emetic which she took yesterday morning operated well. Still complains of pains in knees and back; throat not very painful; fever slight; some coldness at times. The belladonna pill which she took last night gave her some relief.

Treatment.—Let the pill be repeated to night, and let her have to-morrow morning ten grains of calomel with thirty grains of jalap.

24th. Pains returned in the evening. The head was very painful, and the throat more complained of. This morning some pain of head, but no pain in the back or joints.

Treatment.—Let her have a warm bath in the evening.

25th. The purgative taken yesterday operated well; feels much better. Convalescent.

In my note-book I have specified only those symptoms which were of any importance or different from the ordinary cases of scarlet fever. It must not, therefore, be concluded, that, because the usual symptoms of scarlet fever are not mentioned, they were not present; for in few cases was the disease better formed or the eruption more complete.

Case 2.—May 5th, Miss Louisa Pennimacour, between 30 and 40 years, was attacked with scarlet fever, with sore throat; the disease was very severe; and towards the close thereof, or in the desquamating stage, she complained much of soreness of skin and pains in the joints of the toes, and of inability to raise one of her arms. Compares her feelings to those she experienced in the dandy.

The wind was from the north east, and evenings chill.

Case 3.—Miss Nancy Denzie, between 30 and 40 years, on the evening of the sixth day from the commencement of the attack of scarlet fever anginosa, during the stage of desquamation, was attacked with great itching of the skin, and with violent pains in the left knee and hips. These pains, she says, are more severe than those she experienced in the dandy. Skin dry. She had taken very little medicine during her attack of scarlet fever.

Ordered a warm bath, and immediately after it to have a cup of tea with ʒi. of colchicum wine, and to have an emetic to-morrow morning, and a purge of calomel and jalap the next day.

The heavy rains which have continued for nearly six weeks have now partially ceased.

20th. Took colchicum last night, and an emetic this morning. Pains much better, and itching abated. Takes her purge to-morrow.

25th. I did not see her again until the 25th, when pain in the knee, which had subsided, again returned. There is no swelling, nor is the pain constant, but returns at irregular intervals, and is most severe in the morning.

Treatment.—Ordered a purge of calomel and jalap, and a blister to the knee.

26th. Convalescent.

June 11th. Some rain; weather chilly.

Miss Sophia Zhenstedt, 12 years of age. Her case was very violent, with much affection of the throat; eruption on the third day. On the fifth day complained of pain in the back, head, joints of fingers and toes. Pains very severe during the night.

12th. Took colchicum wine last night. Much pain in the joints during the night, and in the back; she also vomited much. This morning the vomiting was stopped by ether and laudanum, and a mustard cataplasm to the stomach. The pains afterwards settled in the wrists, and became excruciating.

Ordered cataplasms to the wrists. Slept some after the application of the cataplasms.

13th. Took a warm bath last night. Pains returned during the night in the joints, with pain and sickness of stomach. Slept but little. This morning somewhat better.

Ordered to use Seidlitz powders.

At my visit at twelve to-day she had not vomited since morning, and had taken two doses of the powders.

The 14th and 15th I have not noted, but she continued to improve.

16th. Did not sleep last night; much pain in the back, wrist, and joints. The pains in the right shoulder and small of the back returned, with much burning of the hands; desquamation. At eight this evening, better. The practice in this case consisted in warm baths, mustard cataplasms, doses of calomel, with other gentle laxatives, and anodyne draughts.

17th. Convalescent.

June 11th. Miss Dykers, aged 20. Eruption on the second day of the attack. On the third day complained much of pain in the head, back, and in the joints of the fingers and wrists.

12th. Vomited much during the night and this morning; eruption pale. Some uneasy feelings in the stomach; complains of swelling and congestion of blood in the fingers. Ordered cataplasms to the stomach and wrists. At 2 P. M. vomiting better, and says she feels better; some petechiæ.

13th, 14th, and 15th. Not much better.

16th. Throat better; complains still of pains in the joints, and sometimes of coldness. The pains attack every part of the body, but principally extend from the feet to the hips, and from the fingers to the shoulders. A burning sensation of the eyes. Ordered a draught of laudanum, ipecacuan wine, and peppermint water, to be taken to-night. Took five grains calomel this morning, to be followed by Seidlitz powders. In this case, which was one of great violence, the eruption was not vivid, and frequently disappeared.

17th. Better. 18th. Convalescent.

These rheumatic symptoms were not confined to cases of the anginose variety; but the sufferings of some who had the scarlet fever in its most putrid and malignant form were greatly increased by these pains.

The above cases, if they do not, on comparison with those of the fever of 1827 which are before the public, remove every doubt as to the nature of that disease, may I trust be acceptable to the student of morbid action, as affording interesting specimens of an unusual combination of symptoms.

I shall now extract from my notes two cases of a very rapid termination of this fever,—the one proving fatal eighteen hours after the attack, and the other in less than three days.

Two sisters of sanguine temperaments, of delicate and feeble constitutions, were attacked with this disease, and with symptoms very similar to each other. The force of the disease did not fall upon those parts to which it is by its nature generally determined, but was confined to the nervous system, and proved fatal by its action on the brain. The powers of life were not adequate to produce that reaction necessary to constitute a full developement of the disease, and to determine the action of the poison to those organs where it is destined by nature to display and exhaust its virulence.

Case 1.—Ann Mary Wilson was attacked at five o'clock in the morning with vomiting. I saw her at ten A. M. She had already taken an emetic, which was immediately returned. The pulse was accelerated, face somewhat flushed, skin hot, eyes heavy, and throat inflamed, and of a deep red colour, with two small specks on each tonsil. The papillæ of the tongue were erected, and appeared at its sides through the white crust with which it was covered. I ordered a dose of calomel and jalap, and a gargle composed of sage-tea, alum, and honey.

I repeated my visit at six in the evening, and was told that the medicines had not operated; that she had scarcely spoken since I saw her in the morning, but had remained in a state of apparent slumber, and had some twitching of the tendons. I found her in a comatose state, with a quick small pulse, pale countenance, and a purplish ring round the lips. She was with difficulty roused, and no answers could be obtained from her. The belly was slightly swelled, and seemed to give uneasiness when pressed; the breathing was difficult, and wheezing. She was ordered injections with soap and spirits of turpentine. She took three with some benefit, when she was placed in a warm bath, after which another injection was administered. A blister was placed between the shoulders, and a few grains of calomel administered. She was also ordered to have fifteen drops of a mixture of tincture of valerian and spirits of lavender every hour, and an injection of milk and sugar at ten o'clock, P. M. If the symptoms should grow worse, poultices of garlic and vinegar to be applied to the feet.

10 o'clock, P. M. Symptoms continued to increase; no action from medicines; frequent succussions of the body; moaning; eyes dull, and their humours coagulating; temperature about the arms natural; head and hands warm. Died at twelve at night.

The practice in this case was directed to remove urgent symptoms, and to divert the action of the disease from the internal organs to the surface. But the powers of life were too feeble to co-operate with these intentions.

Case 2.—Sunday 6th of June; Catherine Wilson, of a sanguine temperament, and feeble constitution, was taken early in the morning with vomiting and soreness of throat, which is of a deep red colour, diversified with streaks of a still deeper hue. Eyes heavy, and heat of skin not considerable. Ordered an emetic, which operated well. Some sweating, but still heavy; some delirium at times; pulse quick and small.

Ordered a blister between the shoulders, powders of calomel and jalap, and a warm-bath in the evening. Gargle, decoction of bark. Let her be frequently sponged with warm vinegar and water.

7th. Blister rose well; pulse more full; throat red, but not of that purple-red as yesterday; medicine operated. Ordered a purge of magnesia and rhubarb, and a mixture of quinine to be taken in divided doses. To add some nitre and cream of tartar to the barley-water, and the hands and feet, when hot and dry, to be sponged with warm vinegar and water, and the throat to be often cleaned. No delirium; eruption has appeared.

8th. Eruption very trifling; face pale; pulse quick; eyes watery, and discharging a little matter. At 9 A. M. was attacked with stupor; eyes became fixed and pupils dilated; some purplishness round the lips; tongue moist; pulse upwards of 100.

Ordered blisters to the legs, and five grains calomel to be taken immediately. At 2 P. M. symptoms worse; pupils contracting and dilating; teeth clenched, and frequent succussions of the body; breathing accelerated. Pupils at one time became dilated to nearly the whole extent of the iris, and were of a fiery red colour, like the eyes of cats in the dark; skin moist and soft, and nearly of a natural colour; pulse very rapid. Cataplasms of mustard were applied to the feet, and a pepper plaster to the pit of the stomach.

Vomited several times a green slimy mucus, but with difficulty, owing to the contraction of the jaws. Died a quarter past 4 P. M.

The fever in these cases resembled much that variety of congestive typhous fever described by Dr Armstrong in his treatise on typhus; (in page 80 of the third edition.) The excitement was very imperfect, and in Catherine rose and fell three or four times in the twenty-four hours. In Ann Mary an imperfect stage of excitement occurred once only, when she was immersed in the warm-bath, but lasted for a very short period, and was succeeded by a state of insensibility, with a damp and relaxed skin, pale face, slow breathing, dull eyes, and quick, small pulse. In Catherine, who was the older and more vigorous of the two, there was some effort to determine the disease to the skin; but the powers of life were too feeble to support these efforts, and the eruption soon faded, followed by an oppression of the sensorial functions. One cause of its more speedy termination in Ann Mary was probably that she had but recently recovered from a tedious and painful abscess of the leg. These are cases of great danger, as is evinced by the oppressed and torpid condition of the brain, by the loss of equilibrium, and by the disorder in the circulating system, and by these symptoms generally occurring in subjects in whom the powers of life are feeble.

I met with no other cases which terminated in so short a period, and in a similar manner. I regret much that the feelings of the parents would not allow a necroscopic inspection, which would have rendered these cases exceedingly interesting, and have probably thrown considerable light on the cause of their peculiar symptoms. There can be little doubt that in both of these cases, the brain was the organ principally affected, but in what manner can now only be conjectured.

Since writing this essay, I received the Edinburgh Medical and Surgical Journal for April 1830, and read with much pleasure the observations of Dr A. Murray on a form of scarlet fever, succeeded by rheumatic affections, in illustration of the West Indian epidemic. I never entertained any doubt of the late West Indian fever being a variety of scarlet fever; and if I had, this would have been removed by the able remarks of Dr Murray in the article just quoted. The principal difference between the West Indian eruptive disease and the fever mentioned by Dr Murray, consists in the greater severity of the former, and in its being in many cases accompanied with rheumatic pains from the beginning. I must here correct an error which was committed in my letter on the dandy. The Maxwell, as is there stated, was not the first vessel which carried the disease to St Kitts, but was the means of introducing it into Basseterre, the principal town of that island, it having been previously introduced into Sandypoint, the second town of importance in St Kitts, by some other vessel. By an error in printing, St Kitts is said to lie in a northerly direction from St Bartholomew. It should read, in a southerly direction.

ART. V.—*On Diseased States of the Kidney connected during Life with Albuminous Urine; illustrated by Cases. Part II.* By JAMES CRAUFURD GREGORY, M.D. F.R.S.E. Fellow of the Royal College of Physicians, and one of the Physicians to the Royal Infirmary of Edinburgh.

THE former part of this paper contained under three heads the details of forty-five cases, in which this peculiar organic change of structure in the kidneys, either alone or complicated with various affections of other organs, proved ultimately fatal; and we come now to the last head, under which I proposed to consider the cases of this disease that have lately occurred in the practice of the Royal Infirmary, namely :—

IV. *Cases in which the Patients were either relieved or restored to apparent Health at the time of their dismissal.*

From the general similarity of the symptoms, I have little hesitation in classing all the following cases with those already published, as being connected with more or less of disease in the kidneys.

CASE XLVI.—*Elizabeth M'Cabe*, aged 18, was admitted, under my care, on the 9th of April 1831, on account of constant severe pain of the loins, increased by pressure or full inspiration. Her urine was scanty, and she had some œdema of the legs and hands. She had nausea, but no vomiting ; her skin was hot, and her pulse was 120, and sharp. Her complaints had commenced seven days previously with the pain of the back, followed by scanty urine and œdema of the hands and feet, and were attributed to exposure to cold. The pain of the loins continued acute after the application of leeches ; and twelve ounces of buffy blood were drawn from the arm, after which the pain abated and did not recur, and the œdema rapidly subsided. The urine, which had become more copious, was examined on the 12th, and was found to yield a copious flocculent precipitate on the application of heat. It was 1019 in density. On the 13th, its density was 1015, and it was less coagulable. On the 15th, its density was 1016, and it was copious, and no longer coagulable. She was dismissed, at her own desire, on the 19th, free from complaint, although her pulse was still frequent. Two days afterwards, she was readmitted with a return of severe pain in the loins after fresh exposure to cold, but she had no dropsy. The urine was pretty copious, 1022.5 in density, and again coagulable. The pain abated after cupping on the loins, and did not return. Under the use of supertartrate of potass, squill, and laxatives, the urine became very light-coloured, but never exceeded the natural standard in quantity, and varied in density from 1010.5 to 1017. The coagulability gradually diminished, and latterly a very slight haze only was produced. She was dismissed free from complaint on the 16th of May. She was admitted for the third time on the 27th of June, on account of another return of the pain and tenderness of the loins. This third attack had commenced a fortnight previously, and was attended at first by some œdema of the legs, which had since disappeared. The urine was no longer albuminous; it was light-coloured and generally copious, and varied in density from 1008 to 1023. The pain of the loins abated under cupping and blistering, and did not recur while she remained in the Hospital. She was dismissed free from complaint on the 20th of July. But her pulse still continued frequent; and although we have heard nothing of her since, I have little doubt that sooner or later the disease will return, and probably in a more aggravated form.

Case XLVII.—*John Sinclair*, aged 40, a fisherman, was admitted, under my care, on the 14th of May 1830, with considerable œdema of both legs as high as the knees, of about six months' standing, and attributed to much exposure to cold and wet at sea. He made no complaint of pain, and had no febrile symptoms. There were no signs of disease of the heart or liver. His urine was not much diminished in quantity, and speedily became copious under the use of supertartrate of potass. On the 15th it was found to be albuminous, and 1011 in density. The œdema rapidly diminished; and on the 19th, he was dismissed, at his own desire, free from complaint I unfortunately neglected to examine his urine on that day, and we have heard nothing of this man since his dismissal.

Case XLVIII.—*Mrs Laird*, aged 63, was seized, after exposure to cold and wet, seven weeks before her admission, under my care, on the 19th of May 1830, with pain referred to the anterior part of the chest, cough and expectoration, some dyspnœa, and occasional palpitation. About a fortnight afterwards œdematous swelling of the face and hands came on, with constant pain in the loins, scanty urine, nausea, and some vomiting. At the time of her admission, the œdema of the face and hands had subsided, but there was much œdematous swelling of the legs. The lower part of the abdomen was swollen, but without distinct fluctuation. Her urine was very scanty, of a deep colour, 1025 in density, and yielded a copious flaky precipitate on the application of heat. Her breathing was still hurried, and her pulse irregular in strength and frequency. The signs of a catarrhal affection were heard over both sides of the chest; but there was no increased impulse or sound of the heart's action. Under the use of digitalis and squill, and supertartrate of potass, the œdema gradually diminished; the breathing became easy, and the urine became copious. On the 25th it was ten pounds in quantity, and was no longer coagulable. On the 27th the œdema was nearly gone. On the 12th of June, there had been no return of the œdema, and the urine was natural in colour and quantity. Her pulse was still somewhat irregular; but she was otherwise free from complaint, and was dismissed on that day. We have heard nothing of her since.

Case XLIX.—*Margaret Campbell*, aged 40, was admitted under my care, on the 3d of March 1829, labouring under enlargement of the abdomen, with obscure fluctuation, and œdema of the legs, of ten days' standing. Her urine was scanty, and of a reddish colour, and had been so from the commencement, at which time she had pain of the loins, continuing for some days. She had occasional vomiting, much cough, with copious expectoration, and presented many of the signs of phthisis. She knew no cause for her complaints, but had been a patient in the hospital two years previously, on account of a severe attack of rheumatism. At the time of her admission, the urine became turbid, and yielded a copious flaky precipitate on the application of heat. It continued more or less coagulable during the whole period of her residence in the hospital, but its density was not ascertained. Under the use of the supertartrate of potass, the urine became more copious, and the dropsical symptoms diminished; and on the 12th, the œdema and the enlargement of the abdomen had disappeared. She was still affected with cough and other phthisical symptoms, but they were not urgent, and she was dismissed much relieved on the 28th of March. I am ignorant of the ulterior history of this case.

Case L.—*Mary Ewart*, aged 32, was seized eight weeks before her admission under my care, on the 12th of February 1830, with nausea and vomiting, after long-continued constipation, followed by swelling of the abdomen. When admitted there was considerable enlargement of the abdomen, which appeared to be chiefly tympanitic, and without distinct fluctuation. There was no œdema of the limbs. Her bowels were constipated, and she complained of flatulence, with other dyspeptic and hysterical symptoms. Her urine was scanty, of a deep colour, and strongly coagulable on the application of heat. On the 21st, when lighter coloured, it only became slightly hazy, and its density was 1013.5. On the 27th it was again more coagulable. Under the continued use of laxatives and squill, the enlargement of the abdomen gradually diminished, and the urine became more copious. She was dismissed much relieved, although she still suffered occasionally from dyspeptic symptoms, on the 2d of June. Her urine was not examined at that time, and she has not presented herself at the hospital since her dismissal.

CASE LI.—*Thomas Forrest*, aged 45, a labourer, was admitted under my care, on the 18th of December 1829, labouring under enlargement of the abdomen, with distinct fluctuation, and œdema of the legs. He had been a patient in the hospital eleven weeks previously with similar complaints, and had been dismissed relieved. At the time the dropsical swellings returned, he had some cough and shortness of breath, which had since disappeared. His urine was very scanty and high-coloured, 1025 in density, and albuminous. His pulse was rather frequent and full, but there was no strong action of the heart. Twelve ounces of blood were drawn from the arm; it did not show any buffy coat. Under the use of supertartrate of potass, squill, and afterwards digitalis, the œdema diminished; and the urine became somewhat more copious; but it never exceeded the natural standard in quantity. When dismissed, at his own desire, on the 10th of January 1830, the œdema had disappeared, and his general health was good; but there was still some hard tympanitic enlargement of the abdomen, though without fluctuation. We have heard nothing of him since that time.

CASE LII.—*Margaret Kay*, aged 60, a widow, was admitted under my care on the 24th of July 1831, on account of pains referred to the sternum, with dyspnœa, cough, and scanty expectoration of two months' standing These symptoms had increased in severity before her admission, and were ascribed to exposure to cold, and over-exertion. The abdomen was enlarged, but without fluctuation, and she had slight œdema of the feet and ankles. The signs of catarrh were heard extensively over both sides of the chest. Her pulse was frequent, full, and firm. She was bled to the extent of sixteen ounces, and took a solution of tartar emetic, with great relief to all her symptoms. The urine next day, reported to be passed in pretty good quantity, was 1010 in density, and became hazy on the application of heat. On the 29th the œdema had disappeared, and although she had still some cough, and her pulse was rather frequent, she expressed herself as free from complaint, and was dismissed at her own desire. The urine was not again examined, and we have heard nothing of this woman since her dismissal. As the urine in this case was but slightly affected by heat, and as the symptoms of an inflammatory affection of the chest were well marked, I should have hesitated about inserting it here, had I not been determined by the low specific gravity of the urine.

CASE LIII.—*Catherine Reid*, a married woman, aged 40, was admitted, under my care, on the 9th of August 1831, on account of severe pain of the loins increased on pressure, stretching round to the abdomen, and occasionally shooting down to the pelvis and thighs. There was considerable tenderness about the umbilicus and right hypochondrium, with slight distension of the abdomen; but there was no fluctuation. Her bowels were constipated, and her tongue foul; but her pulse was nearly natural. Her complaints were of five months' standing, and were attributed to carrying a heavy burden for some distance, after which she was seized with profuse menorrhagia, recurring at intervals, and accompanied by œdema of the feet and hands. This was scarcely perceptible when she was admitted; and although her appearance was leucophlegmatic, she had no return of the dropsical swellings during her residence in the hospital. Her urine two days after her admission was scanty, but light-coloured; its density was 1016, and it became hazy on the application of heat. After cupping on the loins, and the application of leeches to the abdomen, the pain abated, and did not recur. But she had a good deal of nausea and vomiting, and these symptoms soon became complicated with obstinate diarrhœa, which continued more or less severe, notwithstanding the use of opium in pretty full doses, for about a month. During this time the urine continued scanty, and on one occasion, when of a pale straw colour, and not above a pound in quantity, it was only 1009 in density, and had lost its coagulability; but it still yielded a flocculent precipitate on the addition of a solution of corrosive sublimate. Under the use of supertartrate of potass in doses of half an ounce daily, the urine rather suddenly increased to four pounds, became nearly colourless, and varied in density from 1006 to 1008. At the same time the vomiting and diarrhœa ceased, and on the 24th of September she was dismissed, at her own desire, much relieved. Her urine on that day was again slightly coagulable on the application of heat.

This woman was readmitted, under the care of my colleague, Dr Christison, on the 5th of October, with a return of the pain of the loins and abdomen, followed by obstinate vomiting and diarrhœa, but unattended by any distinct dropsical symptoms. On the 7th her urine was two pounds in quantity daily, light-coloured, 1008 in density, slightly coagulable by heat, and more distinctly so by corrosive sublimate. These symptoms continued with little change for more than a fortnight, and she was dismissed, at her own desire, relieved, on the 29th. She has not since presented herself at the hospital.

The following thirteen cases have been kindly communicated to me by my colleague, Dr Christison, under whose care they occurred. In the three first, it will be observed, there was no dropsy ; and in two others the symptoms of disease of the kidney were complicated with those of disease of the heart.

" Case LIV.—*Jane Sidey*, aged 21, unmarried, had been affected for nearly five years with pain in the loins, and for two years with occasional attacks of pain in the lower belly, and pain after passing water, when she was admitted at the end of August 1829. At this time these complaints were unusually troublesome, and she was also liable to acidity and other dyspeptic symptoms. The urine varied from one pound to two pounds and a half daily, had a density of 1017.5, contained a considerable mucous deposit, and, when this was removed by filtration, presented a pale colour, and considerable coagulation under heat. She had never had any œdema or other dropsical complaint, and her countenance was not leucophlegmatic.

" She remained in the hospital till the middle of October, when she was dismissed free from complaint. The pain in the loins varied much, and together with the dysuria was several times removed before her ultimate recovery. On one occasion, about the middle of September, she had an attack of severe pain in the right hypochondrium, shooting to the left side and downwards to the thigh, with tenderness in the right flank, but without sickness ; and at this time the urine was forty-eight ounces daily, rather pale, 1018.5 in density, and gave a scanty flaky precipitate when heated. The treatment consisted in the application of leeches and the abstraction of blood by cupping, the administration of squill and opium, with the daily use of cream of tartar. The local abstraction of blood was invariably followed by relief. The urine was never materially increased in quantity by the diuretics. At the time of her discharge from the hospital, the lumbar pain and dysuria had been for a considerable period absent, and her general health was good ; and we have not heard of her since.

" Case LV.—*Alison Murray*, aged 38. This patient was admitted at the middle of December 1829, on account of an attack of catarrh ; but on examining her case particularly, she was found to have all the symptoms of organic disease in the kidney,—dull constant pain in the loins, copious discharge of urine to the extent of seven pounds daily, without diuretics, which was very red, strongly coagulable, and 1008 in density. She had no œdema or swelling of abdomen. But she reported, that two years before she had a severe attack of dropsy, which affected the limbs, belly, and face, was attended with scanty urine, and continued about a fortnight. She was dismissed from the hospital in the course of a fortnight, the pain in the loins having been completely removed by cupping, and her catarrh cured. The urine, however, continued copious, though very low in density; its coagulability was diminished, and the red colour had disappeared. She has not to my knowledge been reported at the Infirmary since.

" Case LVI.—*Catharine Murray*, aged 28, a widow, was admitted towards the close of January 1831, on account of severe urinary complaints of twelve months standing. Every ten minutes she was seized with severe bearing down pain towards the back of the pelvis, compelling her to evacuate her bladder. The catamenia had been long irregular, and for seven months had ceased entirely. She was much emaciated and exhausted in strength; but her appetite was good, and digestion undisturbed. The urine varied from 64 to 96 ounces daily, was sometimes deeply tinged with blood, was distinctly, though not strongly coagulable, and had a density of 1014. The pulse was frequent, and rather sharp. She had never had dropsy. She was carefully sounded, without any indication of stone being discovered.

" The treatment in this case consisted in leeches applied frequently to the loins, afterwards a caustic issue in the same quarter, suppositories of opium regularly every evening, and occasional laxatives. Under this system the pulse became natural, the micturition was diminished in frequency to once in 35 minutes, and the pain which preceded each discharge became more tolerable. In the middle of February the catamenia appeared, but without any change in the symptoms, except that the urine became much more coagulable, its density continuing about 1013. After this she had frequent rigors, not followed by heat or acceleration of pulse, but sometimes by perspiration. About the end of February I resolved to try the effect of mercury, and gave a grain and a half of calomel three times a-day. When she had taken five doses, mercurial fetor made its appearance, and a violent salivation quickly set in; but it abated rapidly under the application of leeches behind the jaw, and the use of large doses of acetate of lead. While the salivation continued, the micturition was reduced to once every hour. The urine during the salivation was from four to six pounds daily, and towards the close of it was bloody-coloured, 1014 in density, and very strongly coagulable. On the 6th of March, after the salivation had nearly ceased, the urine was 32 ounces in quantity, strongly coagulable, but passed only once every two hours, and with less pain. After this period she gained strength, and was able to leave her bed. On the 23d March, when my period of service terminated, the urine was natural in quantity, 1012 in density, and still very coagulable. She was dismissed relieved on the 11th of June, and we have not heard of her since, as she went to Glasgow.

"CASE LVII.—*Catharine Keith*, a married woman, about 30 years of age, had been subject to dyspeptic complaints, dysuria, piles, and occasional œdema of the ankles, for two years previously to her admission towards the close of November 1829. At that time she had pain, generally dull, but sometimes acute, in the loins, and also at the pit of the stomach, increased after taking food, and relieved by vomiting. She had no œdema, but was considerably emaciated, and her pulse was frequent and feeble. For some days after her admission she scarcely passed four ounces of urine on an average daily, and at times passed none for twenty-four hours. It deposited a copious brick-coloured sediment at this time; but its chemical composition was not examined. On the 2d of December, after a fit of acute pain in the loins, and while the catamenia were still flowing, she passed by the urethra a considerable quantity of blood loosely coagulated; and for two days the discharge from the bladder appeared to consist fully more of blood than of urine. This discharge was attended with considerable relief to all her complaints. On the 5th the urine was of a pale brownish-red colour, slightly muddy, very coagulable when heated, 1010 in density, and below the natural standard in quantity. She had leeches applied, and was cupped on the loins, and took squill and opium, rhubarb and magnesia, and other remedies, with some relief to her various symptoms. Under this treatment the urine slowly increased in quantity, and its coagulability diminished, till on the 14th it amounted to thirty-two ounces, was nearly natural in colour, became merely hazy when heated, and had a density of 1017.5. On the 21st it was twenty-four ounces in quantity, 1025 in density, and free even from haziness when heated. About this time slight œdema of the ankles towards night was first observed since her admission. But it never became considerable, and disappeared and reappeared according to the state of the urine. Digitalis was added to the squill, and a mild course of mercury was commenced; but it affected her mouth in five days, and was therefore discontinued. But the urine, notwithstanding the use of these diuretics, again slowly diminished to a few ounces daily, and the pain of loins returned, with pain in the right iliac region shooting down the thigh, painful micturition, and sickness. The cupping on the loins was thrice repeated with much relief; and under the addition of cream of tartar to the other diuretics, the quantity of the urine gradually increased, but it was very irregular in its nature. It varied in quantity from eight ounces to six pounds, and in density from 1010.5 to 1030. At one time the reddish colour returned, and with it the coagulability. But when last examined, on the 22d of March, it was natural in quantity, above 1025 in density, and not at all coagulable. At this time her general health had improved, and the dyspeptic and urinary symptoms had disappeared. Diarrhœa and tormina, apparently connected with her dyspeptic complaints, to which she had been very liable during the first two months of her residence in the hospital, yielded eventually to the use of carbonate of potass and cream of tartar. She was dismissed free from complaint on the 4th of May 1830, and we have not heard of her since, though she was cautioned to return the moment she should relapse. This case may be considered as having presented two periods of convalescence, corresponding with the complete restoration of the natural quality of the urine, after it had been previously, and on each occasion, disordered to a very great degree.

"CASE LVIII.—*Christian Gray*, aged 40, a woman of full habit and dissipated appearance, was admitted into the Infirmary on the 30th November 1830, with aggravated symptoms of inflammatory dropsy. She reported that after being subject for three or four weeks to dyspnœa, she was attacked a few days before admission with headach, giddiness, ringing in the ears, bleeding at the nose, puffy swelling under the jaw and of the limbs, and enlargement of the abdomen. When I first saw her the pulse was 96 and firm, the skin warm, and her countenance florid. The urine was natural in quantity, of a cherry-red colour, 1018.5 in density, and slightly coagulable by heat. Twenty-six ounces of blood were immediately withdrawn from the arm, with great relief to the breathing, and some diminution of the dropsical swelling; and in a few hours afterwards the urine was yellow in colour, deposited a copious lateritious sediment disappearing on the application of heat, and did not become even hazy when boiled. Next day the urine was 1020 in density, three pounds in quantity, and again somewhat coagulable. Two days afterwards the swelling and dyspnœa having increased, and the urine having become scanty, the blood-letting was repeated; and this was followed by increased secretion of urine, and alleviation of all her complaints. On the 8th December the urine was forty-eight ounces, faintly coagulable, and 1013.5 in density. In three days more it was 1020, loaded with lateritious sediment, and not at all coagulable. Till this time she had been taking digitalis and a little mercury, the latter of which was discontinued as the mouth had become sore. On the 17th, the swelling of abdomen was rather increased, though squill had been added to the digitalis, and she was therefore bled a third time, with some relief. The urine afterwards was 1018.5 in density, and not coagulable. Cream of tartar was now added to the other diuretics. On the 23d the urine was forty-eight ounces, natural in colour, and not coagulable. On the 2d January the quantity was sixty-four ounces; on the 4th twice as great; and there was at length a material subsidence in the whole dropsical swellings. On the 15th it was eighty-eight ounces, 1019 in density, and not coagulable. For a fortnight afterwards her state remained stationary, and she was gaining strength. But on the 4th February the abdomen having again become enlarged, though the urine continued to be from ninety-six to 112 ounces daily, and the pulse having risen to 100, she was bled a fourth time from the arm, and, as formerly, with relief. Next day the urine was 1016, not coagulable, and its quantity ninety-six ounces. She again went on improving steadily for five weeks, during which the surest diuretic appeared to be a full dose of sulphate of magnesia every other day. On the days she took the salt she passed six pounds of urine, on other days only three pounds. Under this system there was on the 14th March no swelling of the ankles, even after she had been out of bed all day.

"About this period her convalescence was checked by a severe attack of acute rheumatism, for which she was once largely bled, and then sweated by ipecacuan and opium. At the close of this attack the urine was scanty, 1014 in density, and not coagulable. Afterwards her convalescence went on steadily, and about the middle of April she was dismissed apparently in good health. The state of the urine was not attended to after the 20th March, about which time my annual period of service terminated. I have since been informed that she was seen two months afterwards in the same state as at her admission, but I have not been able to learn the particulars of her illness. It is worthy of remark, that on the three first occasions when she was bled for the dropsy, and on the fifth occasion when she bled for rheumatism, the blood was buffy, and cupped to a degree I never witnessed before or since, except in some parallel cases of dropsy connected with diseased kidney. On the fourth occasion the state of the blood has been inadvertently omitted in the report.

"Case LIX.—*Isabella Gaylor*, aged 28, unmarried, was admitted into the Infirmary about the middle of December 1830. For five years the menstrual discharge had been suppressed, and she had been liable to leucorrhœa. About a year before admission she was confined by rheumatism in the legs. Six weeks before admission she began to be much affected by pain in the loins. Afterwards her legs began to swell, and the swelling gradually affected also the belly and face. When admitted, there was inconsiderable swelling of all these parts, extreme leucophlegmatia, tenderness in the hypogastrium, dull rending pain in the loins stretching down the thighs, sickness after meals, and general listlessness and oppression. The urine, although she had taken no diuretics, was about ten pounds daily, and during the whole period of her residence in the hospital was never less than seven pounds. It was at first moderately coagulable, very pale, and 1007 only in density. The pain in the loins was in a great measure removed by a moderate blood-letting; and that of the lower belly was more slowly removed by leeches, and occasional laxatives. Before the blood-letting the urine was 1009 in density, and very slightly coagulable; but after it the coagulability was for a time greater than ever. Subsequently there was little coagulation, sometimes a mere haziness, and the density varied from 1009 to 1010. In the middle of January she was attacked with symptoms of general fever, for which it was thought expedient to resort again to blood-letting; but this attack went off with profuse perspiration. After this, the œdema and swelling of the abdomen, which for three weeks had entirely disappeared, again began to manifest themselves, although the urine continued about ten pounds in quantity daily. In a few days, however, they again disappeared, and did not return so long as she remained in the hospital. About the middle of March she was dismissed free from pain and swelling, improved in strength, though still languid and leucophlegmatic, and passing a large quantity of water of the density 1010, and slightly coagulable. She has not presented herself at the hospital since that time. During the whole period of her residence, she was very liable to diarrhœa and tormina, so that it was necessary to administer laxatives for occasional costiveness with considerable caution, and at times to give opiates and astringents after their operation had lasted for a sufficient length of time, otherwise the discharge from the bowels became profuse, and continued unseasonably long.

"Case LX.—*Jane Weir*, aged 25, was admitted on the 23d November 1830, with œdema and leucophlegmatic appearance,—pain in the back, and frequent pulse. Her general health was good, except that the catamenia had been fifteen months suppressed. Her urine was pale, copious, moderately coagulable, and in density 1010.5.—She was bled and the blood was much buffed; and then took squills with opium. On December 2d, she was dismissed, at her own request, quite free from complaint, the urine continuing coagulable, 1009.5 in density, and in quantity about 128 ounces daily. We have heard nothing of this woman since.

"CASE LXI.—*William Graham*, aged 45, had been about a year at home after twenty-nine years service in the East Indies, when he was seized five days before his admission with general dropsical swelling of the whole body, and scanty, bloody, painful micturition, subsequently to exposure to cold and wet in the month of February 1831. He had also cough and much dyspnœa, extreme leucophlegmatia, headach, and a full rather hard but not frequent pulse. The urine was about thirty-six ounces daily, very coagulable, and 1020.5 in density.—The treatment consisted in two copious blood-lettings, and the use of digitalis and supertartrate of potass, with other remedies for subordinate symptoms. The urine was not affected, but copious watery stools to the amount of sixteen every day were produced, without pain or other uneasiness. Under these circumstances his symptoms abated, the pectoral ones quickly, the dropsical more slowly. He was dismissed about the end of April cured of his dropsical and pectoral complaints, and has not returned to the hospital since that time. On each occasion when blood was drawn, there was scarcely any buffy coat; the serum was only 1024 in density. On each occasion the urine acquired two degrees of density after the evacuation of blood, but retained its coagulability; the state of the urine subsequently varied, the density being from 1021 to 1027, and the coagulability sometimes reduced to a considerable haze merely, but at the end of March it was again highly coagulable. After this its state was not observed, as my period of service had ceased. Its colour was generally natural; but on one occasion it was extremely sanguinolent for two days.

"CASE LXII.—*Daniel Dornan*, aged 55, had been for thirty years subject to dropsy, and to pectoral complaints for a year. When admitted towards the close of February 1831, he had urgent pulmonary catarrh and emphysema, with inconsiderable ascites and a good deal of œdema of the legs and arms. The urine was 1020 in density, considerably coagulable, about twenty ounces in quantity daily, and before admission had been dark blood-red, but was of natural colour when I first saw it.—The treatment consisted in a moderate blood-letting followed by the daily use of supertartrate of potass, under which he had a profuse watery discharge from the bowels without pain or other uneasiness, and likewise some increase in the urinary secretion. The dropsy at the same time quickly disappeared, and the pectoral symptoms also diminished with rapidity. Eleven days after admission the urine was forty-four ounces in quantity, 1018 in density, and quite free of albumen; in five days more it was sixty ounces, 1020 in density, and of natural colour; and he had no œdema whatever. In another fortnight he was dismissed with his pulmonary catarrh nearly gone, and the urine about eighty ounces in quantity, 1016 in density and slightly hazy.—In this case the blood drawn was not buffy. The improvement in his strength and general comfort in the course of a month's residence in the hospital was very striking. I have seldom seen a worse case of pulmonary catarrh and emphysema restored to a tolerable state of health. The ulterior history of this case is not known.

" Case LXIII.—*James Macpherson*, aged 49, had been liable to weakness and pain in the back for years, and when admitted on 13th March 1831, he had slight general dropsy, tympanitic distension of the abdomen, tenderness across the epigastrium, and a sense of weakness in the back. The urine was rather greater in quantity than natural, 1015 in density, and faintly coagulable. Immediately after being put on a course of supertartrate of potass, the urine quickly rose in quantity to 160 and 180 ounces daily. The last careful examination was on the 22d of March, when it was scarcely coagulable, and 1012 in density. Three weeks afterwards he was dismissed cured of his dropsy, and much relieved as to general feeling of health and comfort; and we have not heard of him since.

" Case LXIV.—*Robert Phin*, aged 56, was admitted on the 17th March 1831, with symptoms of hypertrophy of the heart, pulmonary catarrh, enlargement of the liver, and general dropsy,—which complaints were of several years' standing. The urine was very scanty, high-coloured, in density 1023, and slightly coagulable. Under the use of supertartrate of potass and digitalis, the urine was in a few days increased to 100 and 160 ounces, under which the dropsical swellings quickly diminished. After six weeks' residence in the hospital he was dismissed relieved, and has not since returned to the hospital. The state of the urine is not noticed in the reports taken after my period of service ceased on the 23d March.

" Case LXV.—*John How*, aged 20, was admitted on the 12th March on account of severe symptoms of an affection of the heart, which was obviously enlarged to an enormous degree. He had also general dropsy united with considerable corpulency. The urine was natural in colour, very coagulable, 1016 in density, and reported to have been copious for some time before admission. Blood was drawn from the arm with relief, and afterwards digitalis given with the effect of increasing the quantity of urine to 130 ounces daily. He was dismissed relieved on the 2d April; but his precise state is not mentioned in the reports for some time before, and we have not heard of him since. The blood which was drawn on the 13th March was much cupped and very buffy, and the serum was opaline and deficient in albumen, its density being only 1024.

"CASE LXVI.—*James Mackenzie*, aged 43, had been a patient in the Infirmary during the month of February 1830, on account of an acute attack of pain, tenderness and distension of the abdomen, with scanty urine, but without dropsical symptoms as it would appear at that time. The treatment consisted principally in blood-letting and blistering, and he was dismissed cured at the end of the month. He was readmitted in July of the same year, with a return of the pain of the abdomen, now, however, accompanied by ascites and œdema of the legs. His urine at this time was scanty, 1015 in density, and coagulable. He was bled to ten ounces, and the blood was buffy; leeches were applied to the abdomen, and he was put on the use of digitalis and other diuretics. Under this treatment the pain was removed, and the dropsical swellings rapidly diminished. The urine became copious and less coagulable. He had a slight attack of diarrhœa, but was dismissed cured early in August. He was admitted for the third time, under my care, on the first of February 1831, with severe pulmonary catarrh, and a return of the ascites and œdema of the ankles. The urine was natural in colour, rather copious, 1016 in density, and strongly coagulable. Under the use of squill and digitalis both the dropsical and catarrhal symptoms abated. The dropsical swellings disappeared very slowly, notwithstanding a constant discharge of between five and ten pounds of urine daily, the density of which was never under 1017. At the time of his dismissal, on the 14th of April, he had no dropsy, and was very much relieved of all his complaints. The ulterior history of this case also is unknown."

I am indebted to Dr Alison for permission to make use of the seven following cases which occurred under his care. The first proved ultimately fatal, and is remarkable and important on account of the long interval of comparatively good health enjoyed by the patient after the first attack of dropsy.

CASE LXVII.—*Dorothea Gordon*, a young woman of perfectly temperate habits, was first attacked with general dropsy in the year 1820, when she was about 21 years of age. It was attended by cough, shortness of breath, and frequency of pulse, leading to suspicion of phthisis. Her urine was strongly coagulable, but its density was not ascertained. After blood-letting, the dropsical symptoms subsided rapidly under the use of digitalis, which caused a copious flow of urine. She continued subject to occasional cough, but got so well as to carry on her business of a dressmaker very successfully for upwards of eight years afterwards. During the whole of this period she had no dropsy. It was not ascertained whether the urine continued coagulable or not. Early in 1829 she became again dropsical, and, as before, the dropsy was general, and attended by cough and shortness of breath; and once or twice by such pain of the chest and febrile symptoms, as to demand blood-letting, which was followed by temporary relief. But she never had a well-marked attack of pneumonia, nor any unequivocal indications, either of phthisis or diseased heart. Under various remedies the dropsical swellings diminished, and again increased repeatedly during her illness, which lasted a twelvemonth. Latterly they were very great, and the dyspnœa at times was distressing; but she had no delirium, nor did she become comatose before her death. Her urine, during the whole of this illness, continued to coagulate under heat. For some time it was very highly albuminous, but for several of the last months it was very light-coloured and limpid, although scanty, and the coagulum formed in it was very slight, which led Dr Alison to suspect, that in this case, as in some of the others, much of the secreting substance of the kidneys had been absorbed away. Unfortunately the point could not be ascertained, as this case did not occur in the hospital, and no examination of the body took place.

Case LXVIII.—*Miles Paterson*, aged 25, was admitted on the 29th of November 1830, on account of ascites and anasarca. Her menstruation had been irregular for about twelve months previously; and since that time dropsical symptoms had existed to a greater or less degree. When she was admitted, there was considerable œdema of the whole lower extremities, and when in the recumbent position, the face also became œdematous. There was distinct fluctuation in the abdomen, which was distended, and she complained much of pain in the back, sides, and epigastrium. She had slight cough without expectoration, and occasional dyspnœa; but she had no signs of disease of the lungs, and the action of the heart was natural. Her pulse was slow, but full and firm. She had nausea and occasional vomiting, and for eight days previously she had some diarrhœa, with tormina and tenesmus. Her urine was scanty and coagulable. She was bled at first to the extent of sixteen ounces, and the blood was buffy; and she was afterwards twice cupped, and had leeches applied, with relief to the pain of the back and abdomen. Under the use of digitalis, cream of tartar, and other diuretics, the urine rapidly increased in quantity from one to twelve pounds daily, and at the same time the dropsical swellings subsided, and the diarrhœa abated. On the 10th of December the œdema and the swelling of the abdomen had disappeared; but the urine, though generally copious, was still slightly albuminous, and on the 15th was only 1011 in density. On the 20th, when she was dismissed free from complaint, it was natural in quantity and appearance, but still yielded a slight coagulum on the application of heat. She was in good health, and employed as a servant some months afterwards.

CASE LXIX.—*Rosa Macadam*, a widow of plethoric habit, aged 30, was admitted on the 18th of September 1830, labouring under ascites and anasarca, with cough and oppressed breathing. Her complaints had commenced nearly three weeks previously, soon after having drunk largely of cold water while overheated by hard work, with some pain of the chest, and a sense of oppression, followed in a few days by the dropsical swellings, which had since gradually increased. At the time of her admission, the lower extremities were very œdematous, there was some swelling of the face, and there was distinct fluctuation in the abdomen, which was considerably distended. She complained much of pain in the loins, increased by motion or pressure; and during her residence in the hospital she had occasional nausea and vomiting; but she had no diarrhœa, and generally required the use of laxatives. She had considerable mucous expectoration with the cough, and the signs of a catarrhal affection were heard extensively over the chest, which, however, was resonant on percussion. There were no distinct signs of disease of the heart, and the pulse was nearly natural in frequency, although for some time it was rather full and sharp. Her urine at the time of her admission was very scanty, 1022.5 in density, and strongly coagulable. She was bled next day to the extent of twenty ounces, and again on the 1st of October to twenty-eight ounces; on both occasions the blood was buffy, and on the first the serum was opaline. She was twice blistered on the loins on account of the pain. Under the use of digitalis, squill, cream of tartar, and other remedies, the dropsical swellings subsided slowly, and the urine gradually increased in quantity from one to ten pounds daily, and varied in density from 1011.5 to 1019. After the second blood-letting it lost its coagulability for a short time, and although it became again albuminous, it remained very slightly so for the space of a month. Latterly, however, it became again strongly coagulable. But the dropsical swellings continued to diminish, and at the beginning of December had entirely disappeared, and her general health appeared quite restored. She was dismissed free from complaint on the 4th, continued well for some weeks afterwards, and then left town.

Case LXX.—*Joanna Gilchrist*, a married woman, aged 28, had been seized, without assignable cause, seven months before her admission, on the 28th of March 1831, with pain of the abdomen, diarrhœa, with tormina and tenesmus, and frequent vomiting; and these symptoms had continued with greater or less severity since that time. About three months afterwards her legs began to swell, and at the time of her admission the œdema was considerable, especially in the erect position. There was also partial fluctuation in the abdomen, which was tympanitic, and slightly tender on pressure. She had occasional nausea and vomiting, and pain in the loins; and she had amenorrhœa of three months' duration. But her pulse was scarcely affected, and there were no signs of disease of the heart or lungs. The urine at the time of her admission was of pretty natural quantity, straw-coloured, and slightly coagulable. Under the use of diuretics it became very copious, and when from eight to ten pounds in quantity daily, it varied in density from 1007 to 1009. It still, however, continued albuminous. When the coagulum was removed by filtration from a portion, the specific gravity of which was 1009, the density fell to 1008; and when this was evaporated to an eighth part of its volume, numerous flaky crystals of the nitrate of urea were formed on the addition of nitric acid. The diarrhœa was for some time obstinate; but at last abated under the use of chalk mixture and opium. There was at one time some tenderness and always distinct circumscribed hardness at the epigastrium, on account of which leeches and a blister were applied, and Plummer's and mercurial pill given for some time, so as slightly to affect the mouth, with good effect. The urine continued copious, and latterly was scarcely affected by heat; the dropsical swellings gradually disappeared, her general health improved, and she gained flesh. She was dismissed nearly free from complaint on the 3d of June. The dropsical symptoms have, however, recurred since the beginning of winter.

Case LXXI.—*William Taylor*, aged 48, was admitted on the 26th of January 1829, on account of dyspnœa, especially in the recumbent position, enlargement of the abdomen, with distinct fluctuation, and slight œdema of the ankles. His complaints had commenced about a month previously, with extensive œdema of the lower extremities, followed by swellings of the abdomen and scanty urine, after drinking copiously of cold water while heated with hard work. Since that time the œdema had varied considerably in degree, but had never entirely disappeared. There were no signs of disease of the lungs, the heart, or the liver, and his pulse, although occasionally frequent and feeble, was in general but little affected. The urine at the time of his admission was very scanty, turbid, and of a very red colour. When examined some days afterwards, it was found to assume a gelatinous appearance and consistence on the application of heat. Its density was not ascertained. Notwithstanding the continued use of a variety of diuretics and mercury, given so as fully to affect the mouth, it scarcely ever amounted to two pounds daily, and generally was still more scanty. It continued during the whole period of his residence in the hospital of a dark red or dingy brown colour, turbid, and strongly coagulable. He had for some time troublesome diarrhœa, with occasional nausea and vomiting; and as he complained much of languor and debility, it was thought advisable to give stimulants in moderate doses. Soon after he came under the care of Dr Alison in the month of February, as his pulse was then more frequent and stronger than usual, and he complained of headach, he was bled to the extent of eight ounces with good effect, and the blood was buffy and cupped. But the dropsical swellings underwent very little diminution, although his health improved somewhat in other respects, and he was dismissed relieved, at his own desire, on the 19th of March.

It is particularly to be regretted that the farther history of this case is unknown, because it is the only one in which we have observed the urine to become distinctly gelatinous on the application of heat,—an appearance which Dr Bright has also remarked to be extremely rare. It would seem, however, from the experiments of Dr Wells, mentioned in the former part of this paper, that this appearance depends merely on the presence of the serum of the blood in larger proportion than is commonly observed in albuminous urine; and its notable impregnation with the red particles of the blood in this case would favour the same conclusion.

Case LXXII.—*Elizabeth Morgan*, aged 49, was admitted on the 9th of January 1831, labouring under ascites, œdema of the upper and lower extremities, and dyspnœa, sometimes amounting to orthopnœa, on slight exertion or on assuming the horizontal posture. She had frequent cough, with mucous expectoration, and complained of occasional palpitation, to which she had been subject for about a year. She had also been subject to occasional swelling of the feet and legs for a considerable time; but about six months previously to her admission, the œdema became constant, and extended to the thighs and arms, and three months afterwards she observed her abdomen to become enlarged. Since that time the dyspnœa had increased, and during the preceding six weeks she had been unable to sleep in the recumbent position. Previously to her admission, the impulse of the heart's action appeared stronger, and the apex was felt lower than natural; but afterwards the action of the heart could scarcely be felt, and the stroke of the apex could not be ascertained. The pulsation of the carotid and subclavian arteries also appeared somewhat stronger than natural; but the pulse at the wrist was scarcely affected. She had occasional nausea and vomiting, but no diarrhœa; and generally required the use of laxatives. Her urine was very scanty, pale in colour, and albuminous. It was scarcely affected in quantity under the use of squill, digitalis, and cream of tartar, for a considerable time, and continued more or less coagulable during the whole period of her residence in the hospital. About a month after her admission, it was 1022 in density, while only one pound in quantity daily; and latterly, when increased under the use of diuretics to two and afterwards to five pounds, it varied in density from 1013 to 1011. Her mouth was at one time slightly affected by small doses of mercury. Under this treatment, the dropsical swellings diminished, but never entirely disappeared; and she continued subject to occasional fits of dyspnœa. She was dismissed relieved, at her own desire, on the 20th of March.

After this woman's dismissal, the dropsy on several occasions abated considerably under the use of various remedies, especially under full doses of the acetate of potass, but always recurred; and in the month of July there was much œdema of the lower extremities, and of the integuments of the abdomen. Early in September, although the dropsical symptoms had again diminished, erysipelas, with livid spots and dark-coloured bullæ, appeared on the right leg, and her pulse became frequent and small. Notwithstanding the employment of punctures and other remedies, extensive gangrene ensued, and she died on the 10th of September.

Inspection.—There was some serous effusion in the cavity of the chest, but the lungs were healthy. There was some hypertrophy, with dilatation of the left ventricle, and the auriculo-ventricular orifice was larger than natural. The aortic valves were somewhat thickened, but not shortened; the aorta was nearly healthy. One of the columnæ carneæ was thicker, harder, and shorter than natural, and irregular on its surface, so that the portion of the mitral valve to which it was attached must have been much impeded in its movements. There were several pounds of serous effusion in the cavity of the abdomen, and some old adhesions of the omentum to the cœcum and the ileum. Both kidneys were rather large, soft, and light-coloured. The cortical substance in both, but particularly in the left, was of a whitish colour and uniform texture, somewhat resembling encephaloid matter. The tubular portions were more healthy, but exhibited in some places a similar degeneration. A small part of the right kidney appeared nearly healthy. The liver was not enlarged nor hardened, but a portion of it was lighter coloured than natural.

CASE LXXIII.—*Anne M'Dougal*, aged 36, and unmarried, was admitted on the 14th of July 1831, affected with œdema of the feet, legs, and arms, sense of constriction across the lower part of the chest, and some cough without expectoration. She had no dyspnœa or palpitation, there was no strong action of the heart or arteries, and no fulness or tenderness in the region of the liver. The œdema had commenced six days previously, and was at that time attended by some dyspnœa, as well as a sense of constriction across the chest, and also by occasional pain in the right lumbar region. She had headach, nausea, and some vomiting on the day before her admission, but she had not been affected with diarrhœa. Her pulse was 60, full, and firm, and for some time slightly irregular and intermitting. She had little thirst; her tongue was nearly clean; and her appetite unimpaired. She had been in good health before the commencement of these symptoms, and could only attribute them to exposure to cold by getting her feet wet. Her urine was scanty, amounting only to twelve ounces in the first twenty-four hours, and eight ounces in each of the two subsequent days. It was of a dark reddish-brown colour, and yielded when heated a very copious opaque gray or light-brown coagulum. Its density was 1033 on the first day, and on the next 1029. On the third day it was 1025.5, and 1023 after the separation of the albumen, which amounted when dried to fourteen parts *per* thousand. The same experiment was repeated on a subsequent occasion with similar results. Urea, however, appeared at this time to exist in full quantity in the urine, as when evaporated to about a third, numerous reddish-brown scaly crystals of the nitrate of urea were formed on the addition of nitric acid.

On the day of her admission twelve ounces of blood, and two days afterwards ten ounces, were drawn from her arm. The blood was not buffy, and the density of the serum was 1022. She was once cupped on the loins, on account of the pain referred to that region, and was put on the use of digitalis and laxatives. Under this treatment the pain and sense of constriction abated; but the dropsical symptoms continued along with the state of the urine already described, some retching and hiccup, and a slow, firm, occasionally intermitting pulse. Believing this to be a case in which a morbid deposition of lymph in the secreting texture of the kidneys was commencing, Dr Alison wished to try the effect of mercury, given so as to affect the system. Accordingly, on the 15th, two grains of calomel, with one of opium, were given every eight hours. After using this medicine for two days, with laxatives in the intervals of the doses, her mouth became affected, and profuse salivation set in, with so much painful swelling of the lips, tongue, cheeks, and external fauces, that it was thought necessary to apply leeches twice, to have punctures made in her tongue, which discharged several ounces of blood, and to have twelve ounces more taken from her arm, besides the repeated use of laxatives, and a wash containing the chloride of soda. Her mouth continued very sore for ten days, during which time the dropsical symptoms subsided, and the urine became nearly natural in quantity, but its morbid qualities remained unchanged till the 28th and 29th, when the ptyalism had much abated. The quantity of albumen in the urine then rapidly diminished, but at the same time the density fell very considerably. During the month of August, when it was from three to four pounds in quantity daily, it varied in density from 1010 to 1016. It regained its natural colour, and was only slightly albuminous. The œdema, the cough, and the uneasy feelings of which she complained on her admission, disappeared; and her pulse, though still at times slightly irregular, became otherwise natural. Early in September she had an attack of vomiting and diarrhœa, accompanied with much pain of the loins, and some pain and tenderness of the abdomen, and next day the urine had assumed its former dark-brown colour. These symptoms, however, soon abated, and when she was dismissed free from complaint, on the 19th of September, the urine was of natural quantity, and light coloured. It was 1013 in density, and was not affected by heat; but it became hazy, and minute flocculi were formed in it, on the addition of a solution of corrosive sublimate.

I am indebted to Dr Graham for permission to make use of the four following cases, which occurred under his care.

Case LXXIV.—*Helen Fraser*, aged 49, was admitted into the Clinical Ward on the 12th of November 1829, on account of ascites and anasarca, accompanied by dyspnœa amounting occasionally to orthopnœa, cough with considerable mucous expectoration, tenderness at the epigastrium, frequent pulse, and other febrile symptoms. Her complaints were of some months' standing, but had become much aggravated about a fortnight before her admission. She stated that she had laboured under a similar attack about sixteen years previously, but had completely recovered her health at that time. Her urine was very scanty, high-coloured, and coagulable on the application of heat. Its density was not ascertained. Under free purging, and the use of supertartrate of potass and tincture of squills, the dropsical symptoms rapidly disappeared, and the dyspnœa became less urgent; and on the 24th she was dismissed, at her own desire, relieved. The ulterior history of this case is not known.

CASE LXXV.—*Francis Galloway*, aged 31, a brewer's servant, was admitted into the Clinical Ward on the 22d of November 1830, on account of enlargement of the abdomen, with distinct fluctuation, great œdema of the face and legs, frequent pulse, dyspnœa, and severe cough, causing slight pain towards the epigastrium. His complaints had commenced about six weeks previously with cough, followed by the dropsical swellings, which had subsided entirely for a time, and had only reappeared about a week before his admission. His urine, which on one occasion contained a considerable quantity of blood, reported to have been passed after a violent fit of coughing, was at first rather scanty, and coagulable. Its density was not ascertained. He was twice freely bled on account of the pectoral symptoms, and once cupped on account of pain of the back, with much relief. Under the use of the tincture of digitalis and supertartrate of potass, the urine speedily increased to eight and nine pounds daily, and lost its coagulability, while the dropsical swellings and the febrile symptoms rapidly subsided. On the 10th of December the dropsy and dyspnœa had entirely disappeared, and his pulse had become natural. He remained in the hospital, without any return of the dropsical symptoms, till the 3d of January, when he was dismissed free from complaint, except of pain referred to the back. The ulterior history of this case is not known.

CASE LXXVI.—*William Cunningham*, aged 40, a weaver, was admitted into the Clinical Ward on the 10th of January 1831, on account of œdema of the legs, enlargement of the abdomen, with obscure fluctuation, frequent pulse, some dyspnœa, and dry cough, causing pain in the lower part of the chest. The swelling of the legs he had first perceived eight days previously, and the pectoral symptoms had commenced about the same time, but without any previous rigors, or unusual exposure to cold. His urine was scanty, and pretty strongly coagulable; its density was not ascertained. He had been bled before his admission, and was twice copiously bled, and had leeches and a blister applied to the chest, during the first few days of his residence in the hospital, besides the use of tartar emetic in pretty full doses, with much relief to the cough, dyspnœa, and pain. Under the use of the tincture of digitalis, his urine increased to four and afterwards to seven pounds, and at one time lost its coagulability; latterly, however, it was again slightly albuminous. On the 1st of February, when he was transferred to the care of Dr Home, he was free from complaint, and his feet only became œdematous after sitting up. He was dismissed free from complaint a few days afterwards. The ulterior history of this case is also unknown.

Case LXXVII.—*Christian Black*, aged 30, and unmarried, was admitted into the Clinical Ward on 3d of December 1829. This was a well-marked but very protracted case, which ultimately proved fatal under my care. When admitted under the care of Dr Graham, she had great enlargement of the abdomen, with distinct fluctuation; œdema of the legs, especially in the erect position; nausea and frequent vomiting; obstinate diarrhœa; and severe pain of the loins and the lower part of the abdomen. Her urine was scanty, light-coloured, and coagulable. Its density was not at that time ascertained. Her pulse was frequent, she had slight cough, with scanty expectoration, and she had amenorrhœa of two years' standing. Seven years previously, in consequence of a fall on the lower part of the back, she had paraplegia and retention of urine. She recovered the use of her limbs after free bleeding and blistering; but had since that time been affected with incontinence of urine. She enjoyed tolerably good health for nearly six years afterwards, but, about eight months before her admission, she was attacked, after exposure to cold and damp, with pain in the loins and hypogastrium, swelling of the legs and abdomen, severe headach, and general debility. She had become a patient in the hospital on account of these complaints, and, after using various remedies for a fortnight, she was dismissed relieved at her own desire. Ten days after she left the hospital, her urine became again scanty, and the dropsical symptoms began to return, and were followed in a short time by vomiting, diarrhœa, and the other symptoms which had continued to increase since that time. Under the use of squill, digitalis, and laxatives, occasional anodynes, and one application of leeches to the abdomen, the dropsical swellings, as well as the other symptoms, gradually abated; and she was dismissed relieved, at her own desire, on the 5th of January 1830. The urine, however, never exceeded two pounds in quantity, and remained always coagulable.

This woman was readmitted, under the care of Dr Christison, on the 27th of July 1831, labouring under another return of her former complaints. The dropsical symptoms, however, were now very slight, and soon altogether disappeared. She had been subject to more or less of dropsical swellings after leaving the hospital, till the month of February 1831, when they subsided and gave place in a great measure to vomiting and diarrhœa, which had continued in a greater or less degree since that time, notwithstanding the use of various remedies. She had no diarrhœa after her readmission, but the vomiting continued urgent, and was scarcely checked by opium in full doses. She still suffered from pain of the loins and abdomen, but the pectoral symptoms had altogether disappeared. Her urine was very scanty, frequently amounting to a few ounces only; and, even under the use of diuretics, scarcely ever exceeded a pound in quantity daily. Two days after her admission it was 1010 in density, and afterwards varied from 1011 to 1015. It retained its coagulability to the last. She was in a state of excessive debility and exhaustion when she came under my care; her pulse, though not above the natural standard in frequency, and sometimes even slow, was at times barely perceptible, and she vomited almost all ingesta. She rallied several times to a certain extent under the use of wine and opium, but at last died exhausted, and without preceding delirium or coma, on the 15th of September.

Inspection.—The upper part of the right lung, which adhered to the pleura costalis, was much condensed by tubercular deposition, and contained several irregular cavities. The left lung was nearly healthy, and the heart was natural. The liver was hard, lobulated, and granular in its texture; of a pale yellow colour externally, and exhibiting internally the mottled red and yellow appearance known under the name of cirrhosis. Both kidneys were much diminished in size; the right, especially, not being above a third or a fourth of the usual size. They both presented a diseased appearance similar to that of the liver. They were rough, somewhat lobulated, and of a mottled yellow and red colour externally. The cortical and tubular portions of both had almost totally disappeared, having given place to the usual yellowish granular deposit. There was a large oval cyst, about the size of an ostrich egg, filled with a transparent fluid, connected with the left ovary, and a smaller one of a similar nature attached to the right. The uterus was healthy. The mucous membrane of the colon was in several places thickened, and there was a considerable granular deposition on the inner coat of the caput cœcum. The agglomerated glands at the lower end of the ileum were very distinct and prominent, but no ulceration could be discovered in any of them. The kidneys have been preserved.

I am indebted to Dr Home for permission to make use of the three following cases, which occurred under his care in the Clinical Ward.

Case LXXVIII.—*Alexander Williamson*, æt. 50, was admitted on the 9th of December 1828, labouring under great tension and enlargement of the abdomen, without distinct fluctuation, extensive œdema of the lower extremities, the scrotum and the penis, accompanied by some dyspnœa, cough and expectoration, and frequent pulse. His complaints were only of a few days' standing, and had commenced with oppression of his breathing, followed first by vomiting, and afterwards by the dropsical swellings. His urine was very scanty and coagulable on the application of heat. Its density was not ascertained. He was pretty freely bled, with great relief to the pectoral symptoms; and, under the use of purgatives and various diuretics, the urine became copious, and the dropsical swellings gradually subsided. He was dismissed free from complaint on the 21st of January 1830, and has not since that time presented himself at the hospital.

Case LXXIX.—*Thomas White*, aged 44, a mason, was admitted on the 15th of February 1830, on account of some difficulty of breathing, without cough, and considerable œdema of the feet. The sound on percussion, and the respiratory murmur, were natural over the whole chest, and there was no strong action of the heart. He had occasionally severe pain referred to the loins and stretching down to both thighs, and during his residence in the hospital, he had nausea and vomiting for some days, but no diarrhœa. His urine was reported to be passed in pretty good quantity, but was strongly coagulable. His complaints had commenced with febrile symptoms seven weeks before his admission. He was bled once to the extent of fourteen ounces, with relief to the dyspnœa and pain of the loins; the blood was much buffed and the serum milky. Under the use of supertartrate of potass and the tincture of digitalis, the œdema subsided, and the urine soon became very limpid and copious, amounting latterly to six and seven pounds daily, and varying in density from 1007.5 to 1011. At the same time it became less albuminous, but it never entirely lost its coagulability. He was dismissed free from complaint on the 27th of April. The ulterior history of this case is not known.

Case LXXX.—*James Connell*, aged 65, was admitted on the 17th of July 1830, labouring under ascites, great œdema of the lower extremities, dyspnœa, with cough and expectoration, and irregular intermitting pulse. His complaints had commenced about five weeks previously, after taking a draught of cold porter, with rigors, followed by profuse perspiration; after which his urine became scanty, and the dropsical swellings appeared, and from that time had gradually increased. The urine, which was pretty strongly coagulable, soon became copious under the use of diuretics, and the ascites and œdema rapidly diminished. When the urine amounted to nine pounds daily, its density was 1010. On the 26th the œdema had disappeared, but the urine, which had become much less copious, was still slightly coagulable. He was dismissed free from complaint on the 13th of August, having had no return of the dropsy; but his pulse still continued irregular. This man was readmitted under the care of Dr Graham, on the 8th of October, on account of a return of his former dropsical complaints, and was dismissed convalescent on the 7th of November. Since that time the history of this case is unknown.

GENERAL OBSERVATIONS.

On reviewing the preceding thirty-five cases, it will be found, as in the forty-five detailed in the first part of this paper, that none of the patients were below the age of puberty, while, in a large proportion of the whole number, they were above forty years of age—thus corroborating the statement formerly made as to the great comparative infrequency of this disease of the kidney in children and young persons.

These cases also pointedly illustrate the remarks formerly made as to the complications so frequently observed of this disease with affections of other and distant organs. Symptoms of an affection of the lungs or of the heart existed to a more or less marked degree, in twenty out of the thirty-five cases; and of the three which proved ultimately fatal, tubercular disorganization of the lungs, and disease of the liver and intestines were found in the woman *Black* (77,) and organic disease of the heart in the woman *Morgan* (72,) along with an advanced stage of the kidney disease in both. No examination, as already stated, took place in the third fatal case.

The proportion of cases in which dropsical effusion was a prominent symptom is large; but it would be incorrect to draw any conclusion on this point from these cases alone, as in almost the whole of them it was the presence of dropsy which led to the examination of the urine. Out of the whole number, however, that is to say, out of the eighty cases, more or less of dropsical effusion existed in fifty-eight, which is sufficient to prove that, although not an essential symptom, dropsy is a very frequent concomitant of this alteration of structure in the kidney.

The symptoms next in point of frequency, appear to have been vomiting and diarrhœa. One or other, or both of these, existed sooner or later in forty-six out of the whole number of cases, and they were generally troublesome, frequently urgent and untractable, without any distinct signs of inflammatory action.

Another very common symptom, but one upon which I am disposed to place some reliance in this disease, was frequently observed in these cases. I allude to pain referred to the lumbar region. This symptom was present in a more or less marked degree in thirty-three out of the eighty cases; and if we exclude the twenty cases, given in the former part of this paper, in which there was no dropsy and no complaint of lumbar pain, and some of which were not well marked examples of the disease, it will be found that this symptom existed in more than the half of the whole number. It was sometimes deep-seated and dull, sometimes acute, and increased on pressure or motion; in some cases it was constant, in others occasional, and in several it was distinctly described as stretching round to the anterior part of the abdomen, or shooting down to the thighs. In the case of the woman *M'Cabe* (46,) for example, constant severe pain of the loins, increased on pressure or inspiration, formed the most prominent symptom during three several attacks, and demanded active treatment on each occasion. In others, again, it had been a troublesome symptom for years. A sense of pain and weakness referred to the loins is a symptom common to so many diseases and slight ailments, especially among women, that in ordinary circumstances I should pass it over as a sign of little importance in establishing a diagnosis. But I have now seen so many cases, in men as well as in women, in which pain of the loins had formed a very prominent symptom during life, and in which this disease of the kidneys was found after death, that I am inclined to consider it an important diagnostic symptom, when taken along with other and more unequivocal signs.

These cases also illustrate, in a remarkable manner, two other important points connected with this disease, namely, the slow and insidious progress of the symptoms, and their tendency to recur, often without any obvious cause and in a more aggravated form, after apparently perfect recovery, and in some cases after long intervals of comparatively good health. Twenty-five out of the whole number had laboured under previous attacks of dropsy or pain of the loins, and several of these had suffered two or three successive attacks. The young woman *Gordon* (67,) had been attended by Dr Alison during her first attack of general dropsy, when her urine was strongly coagulable, as well as during her second, and he ascertained, that during a period of fully eight years which had intervened between these attacks, she had remained free of dropsical symptoms, and had enjoyed such a degree of health as to follow successfully her occupation as a dress-maker. In one of these cases (62,) the patient, according to his own report, had been subject to dropsy for thirty years; and in another (74,) the patient stated that she had been cured of an attack of dropsy sixteen years previously. The progress of the symptoms was also very slow in a large proportion of the fatal cases detailed in the first part of this paper. Excluding those in which fever or some other acute disease was evidently the principal cause of death, there were only two well-marked cases, (9 and 16,) which proved fatal within a month from the reported commencement of the symptoms; and even in these there was good reason to believe, from the appearances presented by the kidneys, that the history of their complaints given by the patients had been incorrect. One of the best marked examples of this disease that we have met with, is the case of the woman *Black*, (77,) already mentioned, who was ascertained, from having been a patient in the hospital on three several occasions, to have laboured for two years and a-half under the same symptoms, which ultimately proved fatal to her.

As in the former cases, where dropsical symptoms existed, the œdematous swelling frequently affected the hands and the face, and even sometimes commenced there; but it seldom increased to any great extent, although it often proved very obstinate. It disappeared entirely under treatment in twenty-three out of the thirty-five cases; and in several in which there had been two or three successive attacks of the other symptoms, there was no return of the dropsy after the first. In the fatal case of the woman *Black*, the œdema on the third attack was very slight, and soon altogether disappeared.

In regard to the treatment adopted, I have little to add to what has been already stated by Dr Bright and Dr Christison. Out of the thirty-five cases, twenty-two were dismissed free from complaint, or decidedly convalescent, ten were dismissed relieved, and three died ultimately, after having been at one time either relieved or restored to apparent health. Of the twenty-two who were dismissed free from complaint, fifteen had been bled once or oftener, and three who had not been bled at the arm had been frequently cupped, or had leeches repeatedly applied on the loins. In the four remaining cases diuretics acted powerfully, and the dropsical symptoms disappeared without the aid of blood-letting. Under similar treatment the dropsy disappeared in almost all the ten cases which were dismissed relieved. But in these, as in most of the fatal cases detailed in the first part of this paper, the symptoms of disease in the kidneys were complicated with those of organic affections of other organs, particularly of the lungs and heart; and in such cases more could not reasonably be expected under any treatment. It is, of course, only in the earlier stages of this, as of other organic diseases, that blood-letting can be followed by any decided or permanent good effects; and, indeed, from the great debility and exhaustion which usually attend the more advanced stages, it is only at an early period in the progress of the symptoms that general blood-letting is in most cases admissible.

Diuretics generally acted well, and in many cases very rapidly and powerfully. Those most commonly employed were digitalis, squill, and supertartrate of potass; and they were generally found to act best when combined, as, for example, digitalis and squill in the form of pill, or squill pills and supertartrate of potass in doses of half an ounce daily continued for some time. In such doses, supertartrate of potass proved in these cases, as Dr Bright and Dr Christison found it to do in their practice, one of the most certain, and, at the same time, most powerful of the diuretics employed. The spirit of nitrous ether, acetate of potass, and mercury, appeared to act well as diuretics in some cases. It is proper to remark that, in six out of eleven cases, including those in the former part of the paper, in which mercury was given, soreness of the mouth and gums, with mercurial fetor, was produced by a small quantity in a very short time, and in three of these violent salivation set in, with great pain and swelling of the mouth and face, and in one, of the tongue and external fauces, requiring active measures of depletion. These cases, therefore, would seem so far to confirm the observation of Dr Bright as to the tendency to rapid and violent salivation even from small doses of mercury, which exists in this disease, and as to the difficulty which is frequently experienced in restraining its effects.

The remedy found most useful in checking the obstinate vomiting and diarrhœa, which formed so prominent a symptom in a large proportion of the whole number of cases, was solid opium in full doses, and where the diarrhœa was most urgent or existed alone, it was very advantageously combined with chalk, and still more with acetate of lead.

In regard to the causes of this peculiar disease, on referring to the cases which have been detailed in both parts of this paper, it will be found that the first attack of the most prominent symptoms was very generally ascribed to exposure to cold and wet, or sudden alternations of temperature; and, as has been frequently observed in cases of inflammatory dropsy, the patients in four of these cases, those, namely, of *Dudgeon*, (24,) *Macadam*, (69,) *Taylor*, (71,) and *Connell*, (80,) distinctly ascribed the first occurrence of their symptoms to copious draughts of cold water or porter taken while they were overheated.

But it is of importance to remark, that a great majority of these cases occurred, as Dr Bright also found in his hospital practice, in persons of irregular dissipated habits and broken constitutions; in which daily experience shows that there is a great tendency, especially on occasion of inflammation, or even unusual congestion of blood affecting any organ, to minute albuminous deposits taking more or less of the tubercular form. To this common tendency, manifested in affections of different organs, we can have no difficulty in ascribing the frequent combination of this disease of the kidneys with phthisis, with diseased heart and aorta, or with tubercular liver. It is proper to mention, however, that in some of these cases there was no reason to suppose that the patients had led irregular lives, and in a few it was ascertained that they had been of very temperate habits. In these instances I have generally remarked, that they were persons who presented the usual characters of the strumous diathesis.

The connection of dropsy with this diseased and obstructed state of the kidneys is a more obscure point in pathology, than its connection with obstruction in the liver, the heart, or the lungs; nor do I propose to enter upon it at present. But two observations occur on the subject, to which it may be proper to advert. 1. That the dropsical effusion which usually attends this disease, although it often affects the whole body, seldom accumulates to any great extent, and frequently disappears *entirely* after a time, and this especially in the more advanced stages. And, 2. That in the comparatively small number of cases where there is much dropsy connected with kidney disease, there is most generally simultaneous disease of some of the other organs above mentioned.

The low specific gravity, and the albuminous impregnation of the urine, appear to me to be of so much importance as diagnostic signs of this affection, that I have thought it right to draw up in a tabular form the results of the examination of the urine in *fifty* well-marked cases, in order to give as condensed and clear a view as possible of the changes which this secretion undergoes in the disease which forms the subject of these remarks.

For this purpose I have selected, from the preceding details, thirty-eight well-marked cases in which the specific gravity of the urine was ascertained. To complete the fifty, I have added twelve well-marked examples, almost all of which have occurred since the foregoing cases were drawn up for publication. Of these twelve cases five proved fatal, and in two others the patients had laboured under previous attacks of dropsy. It is proper to remark, that in making this selection, those cases generally have been preferred in which the specific gravity was ascertained before any remedies had been employed, and all those in which it was taken only while the patient was under the influence of diuretics have been excluded, in order to guard against any source of error arising from the increased quantity, and consequently diminished density of the urine. This, however, does not apply to five cases included in the table, in which no diuretics had been given, but in which there was a spontaneous diuresis,—a circumstance not unfrequently observed in this disease. I have not inserted two of the cases dismissed free from complaint, in which the density of the urine is stated to have been as high as 1025, while the quantity was very scanty, because, although the symptoms in one of them at least were tolerably well marked, I am not satisfied that the specific gravity was taken in either of them with sufficient accuracy, as I was not at that time in possession of the very useful and ingenious hydrometer of Mr Twaddell of Glasgow, which I have since uniformly employed, and which has been used and recommended for this purpose by Dr Henry. * It is necessary to state, that where I have expressed the daily quantity of the urine in any of the foregoing cases in pounds, the apothecaries' pound of twelve ounces has been understood; and, in the following table, the quantity, when ascertained, has been expressed in ounces, according to the same standard. The first twenty-five were fatal cases, and the remaining twenty-five were dismissed either free from complaint or relieved.

No. I.—*Table showing the Specific Gravity and the degree of coagulability of the Urine in fifty cases of this Disease.*

No.	Quantity.	Colour and Coagulability.	Spec. Grav.
1.	Nearly natural	Very pale, pretty str. coag.	1004.5
2.	Scanty	Coagulable	1006.5
3.	Natural	Nearly colourless, str. coag.	1007
4.	Scanty	Strongly coagulable	1009
5.	Natural	Very pale, strongly coagulable	1010
6.	Scanty	Strongly coagulable	1010
7.	48 ounces	Very pale, strongly coagulable	1010
8.	Scanty	Pretty strongly coagulable	1010
9.	18 ounces	Light-coloured, moderat. coag.	1010
10.	Scanty	Coagulable	1010
11.	Very scanty	Strongly coagulable	1011
12.	Scanty	Very pale, strongly coagulable	1011
13.	24 ounces	Very red, very strongly coag.	1011.5
14.	18 ounces	Dingy brown, very str. coag.	1012
15.	24 ounces	Pale, coagulable	1013
16.	48 ounces	Strongly coagulable	1014
17.	40 ounces	Pale, coagulable	1014
18.	12 ounces	Rather high-coloured, coag.	1014
19.	Scanty	Coagulable	1014
20.	Natural	Strongly coagulable	1014
21.	8 ounces	Strongly coagulable	1014
22.	Very scanty	Light-coloured, strongly coag.	1016
23.	Scanty	Bloody, very strongly coag.	1016.5
24.	Scanty	Very strongly coagulable	1017
25.	Very scanty	Pale, very strongly coagulable	1018
			25297

---

* Experiments on Diabetic Urine, Medico-Chirurgical Transactions, 3d Edition, Vol. ii. p. 121.

Quantity.	Colour and Coagulability.	Spec. Grav.
120 oz. without diuretics	Very pale, moderately coag.	1007
84 oz. without diuretics	Very red, strongly coagulable	1008
12 ounces - -	Pale straw-colour, coagulable	1009
Natural - -	Coagulable	1010
Scanty - -	Dingy-red, strongly coagulable	1010
Copious without diuretics	Pale, moderately coagulable	1010.5
84 oz. without diuretics	Light-coloured, strongly coag.	1011
Natural - -	Bloody, strongly coagulable	1012
Natural - -	Light-coloured, coagulable	1013
36 ounces - -	Pale, coagulable	1013
Nearly natural -	Light-coloured, very str. coag.	1013.5
Scanty - -	Light-coloured, coagulable	1013.5
Natural - -	Light-coloured, very str. coag.	1014
Natural - -	Light-coloured, strongly coag.	1015
Scanty - -	Strongly coagulable	1015
Nearly natural -	Coagulable	1015
Copious without diuretics	Strongly coagulable	1016
24 ounces - -	Pale, very strongly coagulable	1016
40 ounces - -	Pale, strongly coagulable	1017.5
Natural - -	Light-coloured, very str. coag.	1018
Rather scanty -	Cherry-red, moderately coag.	1018.5
20 ounces - -	Pretty strongly coagulable	1020
36 ounces - -	Very strongly coagulable	1020.5
12 ounces - -	Very strongly coagulable	1022.5
24 ounces - -	Straw-coloured, strongly coag.	1023.5
		25362

It will be found that this table furnishes an average of 1011.88
r the density of the urine in the fatal cases, and of 1014.48
those which were dismissed relieved or free from complaint.
e general average of the whole fifty cases, therefore, amounts
ly to 1013.18; and this low density is the more remarkable
en it is considered, that, to avoid the source of error already
ntioned, the specific gravity in a large proportion of the
es was taken when the quantity of the urine was considerably
ow the natural standard, which circumstance would neces-
ily have had the effect, if the secretions had been in a healthy
te, of greatly increasing the general average. I may men-
n, in corroboration of the mean density resulting from this
le, that there is a very remarkable coincidence between it
d that furnished by the cases published by Dr Christison.
taking the average of six cases in which the specific gravity
s ascertained while the urine was not above the natural stand-
l in quantity, I find that the result is precisely the same,
mely, 1013 and a fraction. A seventh case, to which Dr
ristison has alluded, is not included in this average, because
appears in the foregoing table, having been fully detailed in
first part of this paper. Dr Bostock ascertained the den-
y of the urine in nineteen of the cases published by Dr Bright.
some of *these it was taken* several times, in one six times;

and in stating the average of sixteen of these cases to be 1017, Dr Bostock has included in his calculation all the trials of the urine of the same person. But, by first taking the average of each case in which the specific gravity was ascertained oftener than once, and then taking the general average of these nineteen cases, I find that it amounts only to 1014 and a fraction, —a result approaching very nearly to that given by the preceding table.

From this remarkable correspondence in the averages of so great a number of cases, in which the density was ascertained by different observers, it appears to be a general fact, that the specific gravity of the urine in this disease is decidedly lower than in the healthy state of this secretion; and that this low density, especially when combined with scantiness and coagulability of the urine, is a very characteristic sign, if not pathognomonic of the existence of this peculiar organic alteration of structure in the kidneys. It is true that in one of Dr Bright's cases the specific gravity was found by Dr Bostock to be as *high* as 1032, and in one of those detailed above, that of the woman *M'Dougal*, (73,) it was on the first day of her admission as high as 1033, which is about the extreme density of healthy urine. But Dr Bright has not given the details of the first of these cases, and the period of the disease, and the quantity of the urine at the time it was tried are not mentioned. In the case of the woman *M'Dougal*, the symptoms were only of six days' standing, and the urine only amounted to twelve ounces in the first twenty-four hours, and was subsequently still more scanty; and while the proportion of albumen contained in it amounted to fourteen parts *per* thousand, urea was at the same time ascertained to be present in full quantity. This circumstance, along with the scantiness of the secretion, and the early stage of the disease, when the natural salts may be expected still to exist in good proportion in the urine, seems to be sufficient to explain the high specific gravity in this case, and may probably do so in others. This view of the matter receives farther support from the fact, that, at the time of this woman's dismissal from the hospital, after a residence of more than two months, although she was free from complaint, her urine, then natural in quantity, was light-coloured, and only 1013 in density. In regard to the fact of this woman having been dismissed free from complaint, it is of some importance to remark, that in several of these cases the general health was so completely restored, that the patients felt unwilling to remain longer in the hospital, although the urine still continued albuminous, so moderate in quantity, and so low in density, that the solid matter passing off by the kidneys in the twenty-four hours must have been considerably less than the ten drams supposed by Dr Bostock to be the average daily amount of the solid contents of this secretion. But in three, at least, of these cases, the symptoms were ascertained to have returned soon after dismissal, and in one they recurred and proved fatal two months afterwards.

But it may be asked, what is the average specific gravity of healthy urine? As Dr Bostock has observed, "the specific gravity of urine even in a state of health, and in the same individuals, differs so much at different times, according to the period it has been retained in the bladder, and from a variety of other circumstances, that a great number of observations are necessary to enable us to draw any general conclusions on the subject." Hence, probably, arises the remarkable discrepancy in the estimates of different observers. Dr Prout, for example, supposes the average to lie, taking the whole year together, between 1010 and 1015.* Dr Henry was at one time disposed to assume 1020 as the average of that first voided in the morning, but, from subsequent experiments, he was led to believe this number too low, and to consider 1030 as a fair average for the urine passed at that time.† Dr Elliotson, again, has stated his belief, that the specific gravity of healthy urine ranges between 1010 and 1018,‡ while Mr Cruickshank extended the range between 1005 and 1033.§ In the appendix to his translation of Magendie's Physiology, Dr Milligan has given this last number as the specific gravity of healthy urine, while Dr Turner states, that in its most concentrated form it is about 1030.‖ Dr Alison states its average to be about 1025.¶ This last number corresponds with the mean density of the urine of the night and the day, taken in his own person during twelve months, by Dr Bryan Robinson.** None of these gentlemen, with the exception of Dr Robinson, have furnished us with the number of observations on the urine of the same or different persons, from which they formed their respective estimates, and it is impossible to reconcile their discordant statements on this subject. The average density of healthy urine, however, has appeared to me to be a point of much importance, not only in a general and physiological view, but more especially as furnishing a standard of comparison with those cases of disease in which the urine undergoes so many remarkable changes in its physical and chemical properties; and under this impression I have lately undertaken, with the able and zealous assistance of my friend Dr J. H. Balfour, a pretty extensive series of experiments upon this and some other points connected with this secretion. The following table exhibits the results of our investigations on the specific gravity of the urine in fifty young or middle-aged healthy men. All these observations were made between mid-day and two o'clock, during the months of September, October, and the beginning of November; a season of the year during which it would appear, from the experiments and tables of Dr Lining,* that the quantity of the urine furnishes a pretty fair average for that of the whole twelve months. It will be observed that the specific gravity was taken very frequently in some of these cases, and in none less than three times.

---

* Inquiry into the Nature and Treatment of Diabetes, Calculus, &c. 2d edition, 1825, p. 290.

† Experiments on Diabetic Urine, Medico-Chirurgical Transactions, Vol. ii. p. 120, 3d edition.

‡ On the use of Opium in Diabetes, in "Cases illustrative of the efficacy of Hydrocyanic acid, &c." p. 97.

§ Experiments on Urine and Sugar; Rollo on Diabetes, 2d edition, p. 438.

‖ Elements of Chemistry, 2d edition, p. 775.

¶ Outlines of Physiology, p. 113. 1831.

** On the Food and Discharges of Human Bodies; Tab. II. 1748.

No. II.—*Table showing the specific gravity of the urine in fifty healthy men.*

No.	No. of times tried.	Specific gravity.			No.	No. of times tried.	Specific gravity.		
		Extremes.		Mean.			Extremes.		Mean.
1	50	1030	1016	1025.06	26	3	1027	1021	1023.5
2	50	1029	1018	1024.73	27	3	1029	1029	1029
3	20	1030	1014	1024.425	28	3	1027	1014	1022.5
4	20	1033	1016	1024	29	3	1026	1019	1022.666
5	18	1028	1016	1022.583	30	3	1024	1020	1021.666
6	12	1031	1020	1024.542	31	3	1027	1022	1025
7	10	1030	1019	1026.3	32	3	1028	1027	1027.666
8	10	1028	1020	1024.6	33	3	1028	1024	1025.666
9	10	1028	1017	1021.7	34	3	1028	1014	1023 333
10	8	1030	1017	1024.75	35	3	1033	1028	1030
11	8	1027	1018	1023.625	36	3	1026	1022	1023.666
12	8	1029	1022	1026.25	37	3	1021	1018.5	1020.166
13	6	1033	1020	1026.666	38	3	1029.5	1014	1019.5
14	5	1028	1012	1021.6	39	3	1022	1012	1018.333
15	4	1032	1017.5	1026.625	40	3	1026	1005	1018.333
16	4	1028	1022	1025.25	41	6	1026	1011.5	1018.083
17	3	1029	1020	1023.666	42	3	1018	1018	1018
18	3	1027	1026	1026.333	43	3	1020	1015	1017.666
19	3	1026	1023	1024.333	44	3	1022.5	1012	1017
20	3	1027	1016	1021	45	18	1024	1006	1015.527
21	3	1022	1019	1020.333	46	3	1017	1013	1015.333
22	3	1032.5	1028	1030.166	47	3	1019	1011	1015.333
23	3	1026	1022	1023.666	48	3	1026	1008	1015.333
24	3	1026	1022	1024	49	3	1020	1011	1015
25	3	1028	1020	1025	50	3	1019	1010.5	1013.5
Averages,		1028.7	1019.22	1024.45	Averages,		1024.56	1016.22	1020.47

On examining this table, it will be found that the extreme points between which the density ranges are precisely the same as those assigned by Mr Cruickshank,—namely, 1005 as the lowest, and 1033 as the highest. The average of the highest specific gravities in each of the fifty cases amounts to 1026.63, that of the lowest to 1017.72; and it is worthy of remark, that even this last number is considerably higher than the general average of the cases composing the first table. That, as already mentioned, is only 1013.18, while the general average of these fifty healthy cases amounts to 1022.46, and that of the first forty is as high as 1024.05. In the last ten cases, the urine was ascertained to be light-coloured, and considerably above the natural standard in quantity during the period of the observations,—a circumstance which was probably connected with the weather having suddenly become colder at that time, (the end of October and the beginning of November,) and satisfactorily explains the comparative lowness of their respective averages. It will be observed that in the two cases most frequently examined,—namely, Nos. 1 and 2, in which the density was taken on fifty successive days, the average density in the one is 1025.06, and in the other 1024.73, which approaches very closely to that of the first forty cases. With a view to ascertain whether the density of the urine voided in the middle of the day might be considered as a fair average for that passed during the whole twenty-four hours, the specific gravity in the same two cases was taken three times a-day,—namely, on first rising in the morning, between mid-day and two o'clock, and before going to bed, for twenty successive days. The result is subjoined in a tabular form.

---

* Philosophical Transactions, for 1743 and 1745.

No. III.—*Table showing the specific gravity of the Urine of two healthy men, taken three times a-day, for twenty successive days.*

No.	No. of days tried.	Specific Gravity.						General mean.
		Morning.		Mid-day.		Evening.		
		Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	
1.	20	1028 1017	1023.05	1030 1020	1026	1034 1025	1030.65	1026.566
2.	20	1031 1018	1026.675	1028 1018.5	1024.275	1031 1012	1023.725	1024.883

It is proper to remark, that the average daily quantity of urine passed during this period by No. 1, was about forty-five ounces, while that of No. 2 was about fifty-three. This difference in the daily quantity is probably sufficient to account for the slight difference presented by this table in the general mean density of these cases for the three daily periods, as well as the still slighter difference which exists between the averages of the same cases for fifty days. By a comparison between the general mean of each case resulting from this table, and the mean of the urine passed at mid-day, it will be found that they correspond very exactly in both cases; and therefore, in so far at least as these cases are concerned, the mean density of the urine at mid-day accurately represents the average of that passed at other periods of the twenty-four hours. The correspondence of these numbers is the more remarkable, because there is a considerable difference between the densities in the two cases at the other periods of the day,—that of No. 1, for example, being highest at night and lowest in the morning, while that of No. 2 is highest in the morning and lowest at night.

Along with these observations on the specific gravity, a series of experiments was instituted in regard to the action on healthy urine, of the various tests and chemical reagents employed to detect the presence of albumen in compound animal fluids. My limits will not permit me to enter at present into any detail of these experiments; but I may mention a few of the leading facts and the principal results. The tests of the state of the urine employed in the cases of this disease which have been detailed or alluded to in this paper, were heat, corrosive sublimate, ferrocyanate of potass aided by a few drops of acetic acid, nitric and muriatic acids, and alcohol. In a considerable number of the cases each of these tests was tried in succession, and I have not yet met with a single well marked example of this disease in which, when coagulation was produced by heat, the additional tests did not produce a similar effect. This, as will presently appear, is a point of some importance in reference to the action of the same tests on healthy urine. Indeed, from the result of my own observations, I should be disposed to recommend, that when it is wished to ascertain the presence of albumen in suspected urine, one or more of the other tests should be added to that of heat, in order to guard against a possible source of error. For this purpose, I prefer the ferrocyanate of potass, or nitric or muriatic acid, to corrosive sublimate. This last is perhaps the most delicate test we possess of the presence of albumen; but from this very circumstance it is less eligible as a test in suspected cases of this disease, because we have found that it very frequently causes in healthy urine a copious precipitate, differing in no respect from that which it produces in the urine of kidney disease, especially when a saturated solution is employed.

The general, although not quite the uniform, result of 480 trials, is, that in healthy urine heat carried to the boiling point produces no effect, while corrosive sublimate, on the other hand, causes a more or less copious flocculent precipitate, according to the strength of the solution and the degree of concentration of the urine. But in a considerable number of cases in which the precipitate, thrown down by corrosive sublimate, was very copious and precisely similar in all its characters to that caused by the same test in albuminous urine, or in perfectly healthy urine to which a small portion of the serum of the blood has been added, the other tests above-mentioned produced no effect whatever. Nor have I yet met with one instance in which they caused a precipitate when there had been no effect from heat, even although that caused by corrosive sublimate had been very copious. This, coupled with what has been said above, seems to me sufficient to point out the importance of these supplementary tests, and the advantages they appear to possess in this respect over the more delicate test of corrosive sublimate.

I have stated, that this precipitation of healthy urine by corrosive sublimate, though very general, was not universal in the trials we have made, nor was it constant in all the trials of the urine of the same person. It appeared in some cases to be distinctly connected with slight derangements of the digestion, and in two or three it could be produced at will by certain articles of diet, particularly heavy unfermented bread, dumplings, pastry, and other preparations of flour containing suet or butter. In these cases, however, the urine was at the same time coagulable by heat. This albuminous impregnation of the secretion, in persons otherwise in good health, it is important to remark, was not attended in any case by a reduction of its usual density; it was very transient, and where it was induced by certain articles of diet, it generally disappeared after some hours. In some of those cases in which corrosive sublimate caused a precipitate, a slight haze was also produced by heat, and this was generally observed where the precipitate from corrosive sublimate was most abundant.

As Berzelius formerly announced that the property of yielding a precipitate by muriate of mercury, which he seems to have restricted to cases of disease, depends upon the absence of free acid in the urine,* and as in his most recent work,† he appears still to entertain the same opinion, a good deal of attention was paid during these experiments to the state of the acidity or alkalescency of the secretion. Where the urine was neutral or alkaline, corrosive sublimate always caused a precipitate greater or less, according to circumstances; but there were also a great many cases where the urine was decidedly acid, in which it produced a copious flocculent precipitate. These experiments, therefore, would seem to show, that although a neutral or alkalescent state of the urine favours the precipitation of the albumen, the presence of acid, whether uncombined, as Berzelius has stated, or in the form of super-salts, as Dr Prout conceives, does not prevent the separation; and, from my own observations, I should be disposed to conclude with Dr Bostock, that "the deficiency of acid, or the presence of alkali, although separately or conjointly they may produce some effect, cannot be considered the principal cause."*

---

* View of the Progress and Present State of Animal Chemistry, Translated, London, 1813. p. 101.

† Lehrbuch der *Chemie, B. iv. 1831.*

I cannot at present enter upon the question as to the state in which albumen exists in urine, from which it can be precipitated by chemical reagents. Most modern chemists, I believe, now agree that albumen exists in a very minute, but variable proportion in healthy urine; and as it can rarely be detected by heat alone, it is probable that it is present in one of those modified forms to which Dr Prout has given the name of incipient, or merorganized albumen. I may mention on this subject, that I have met with two or three instances in which the urine coagulated strongly under heat, but was not at all affected by corrosive sublimate. This peculiarity was observed in healthy persons, as well as in cases of kidney disease, nor could I trace any connection between it and the particular circumstances of these cases. It was always transient.

In regard to the source of the albuminous impregnation of the urine in this disease of the kidney, I must be very brief. Dr Christison has considered the question, whether the secretion of albumen is vicarious of the secretion of urea? and has shown satisfactorily, that where the urine was very pale, and of very low specific gravity, and where, consequently, the proportion of urea and salts was very small, the quantity of albumen present was also small; while in the cases where the urea was still considerable in quantity, the proportion of albumen was also considerable.† Similar observations were made in several of the cases detailed in this paper; and Dr Bostock has stated, as the result of his experiments generally, "that the quantity of albumen in the urine bore no exact relation to the total amount of its solid contents, or to that of the urea in particular."‡ It appears pretty evident, therefore, that in these cases at least, the albumen contained in the urine was not a substitute for the urea; and the important fact ascertained by Dr Christison, that in this disease urea may be detected in the blood, is sufficient to prove that the constituent elements still unite to form this principle, although its elimination by the kidneys is impeded or obstructed.

The presence of the red globules of the blood in the urine, in a good many of the cases detailed, would seem clearly to indicate that the albuminous impregnation of the urine depends merely upon the transudation of a portion of the serum of the blood unchanged in its passage through the kidneys, especially in the earlier stages of the disease, during which the various shades of colour caused by the presence of the red globules in greater or less proportion, are most generally observed. That this is at least a principal source of the albumen, is rendered still more probable by the circumstance, first observed in one instance by Dr Bostock, that where the urine is coagulable, as in Dr Bright's cases, on which he made his experiments, the serum of the blood has a low specific gravity, and is deficient in its proper proportion of albumen. Healthy serum, by the concurrent testimony of almost all observers, from Dr Jurin downwards, has an average density of 1029.5, or in round numbers 1030. In ten cases Dr Marcet found it to have a mean specific gravity of 1029. I have lately found the average of fifteen cases to be 1030, which corresponds with the observations of Dr Jurin. I have now examined the specific gravity of the serum of the blood in seven well marked cases of kidney disease with coagulable urine, and found it to range between 1018.5 and 1025; and, including the case examined by Dr Bostock, two by Dr Christison, and one by Dr Babington,* the average of the eleven cases amounts only to 1021 and a fraction. In all the cases which came under my observation, there was an evident deficiency of albumen in the serum. These facts seem to point out a material difference in the source of the albuminous impregnation of the urine in this disease, and that of the saccharine matter in diabetes, which Dr Prout considers as consisting in a depraved secretion of urea.† The density of the serum of the blood in this very singular disease has been examined in a few cases; and in these the average is precisely that of healthy serum, which is sufficient to show that the specific gravity of the serum is at least not reduced in diabetes. There is even reason to believe that it sometimes exceeds that of healthy serum. Dr Marcet found it in one case to be as high as 1035.4;‡ and I think I have met with a case in which it was still higher. This fact, coupled with the very marked difference in the density of the urine in the two diseases, showing the great increase in the amount of solid matter passing off by the kidneys in the one case, and the great deficiency in the other, would seem to preclude any reasoning by analogy in the two cases.

---

* Bright's Medical Reports, p. 78.

† On Dropsy from Diseased Kidney; Edinburgh Medical and Surgical Journal, No. 101.

‡ Bright, Op. cit. p. 80.

Whether, under any circumstances, or at any period of this kidney disease, the albumen in the urine may proceed from any other source, or is, in fact, vicarious of the secretion of urea, I cannot take upon me to determine. Dr Prout considers urea as an albuminous product, and one of two principles into which that substance is capable of being decomposed, as he hopes at some future time to be able to demonstrate.* My limits will not permit me to enter at all upon this very important subject; but I may state that the extraordinary relation which Dr Prout has found to subsist between the elementary composition of the proximate principles of healthy urine, and that of the substances which this secretion contains in disease, seems to throw considerable light on this obscure point, and in a singular manner to confirm some of his very ingenious views. I subjoin a table of the analyses of sugar, urea, lithic acid, and albumen, which I have drawn up from those given by Dr Prout.†

---

* Considerations with respect to the Blood. Medico-Chirurgical Transactions, Vol. xvi. Part 2d, p. 315.

† Medico-Chirurgical Transactions, Vol. viii. p. 541.

‡ Ibid. 3d edition, Vol. ii. p. 384.

No. IV.—*Table showing the elementary constitution of four of the most important principles found in healthy or diseased urine.*

Elements.	Sugar.		Urea.		Lithic acid.		Albumen.	
	Per cent.	Per atom.	Per cent.	Per atom.	Per cent.	Per atom.	Per cent.	Per atom
Hydrogen,	6.66	1.25	6.66	2.5	2.22	1.25	7.77	8.75
Oxygen,	53.33	10.00	26.66	10.0	26.66	15.0	26.66	30.00
Carbon,	39.99	7.5	19 99	7.5	40.00	22.5	50.00	56.25
Nitrogen,			46.66	17.5	31.11	17.5	15.55	17.5
Total,	100.00	18.75	100.00	37.5	100.00	56.25	100.00	112.5

From this table it appears, as Dr Prout has observed, " that the weight of the atom of sugar *is just half* that of urea; the *absolute quantity* of hydrogen in a given weight of both *is equal*, while the *absolute quantities* of carbon and oxygen in a given weight of sugar, are precisely *twice* those in urea."

In like manner, the weight of the atom of albumen is just three times that of urea:—the absolute quantity of hydrogen is very nearly, and that of oxygen precisely, the same in given weights of albumen and urea:—the absolute quantity of carbon is just two and a-half times as great in a given weight of albumen, as of urea:—and the quantity of nitrogen is just three times as great in a given weight of urea as of albumen. Taking the atomic weight of sugar as one, then that of urea is to it as two, that of lithic acid as three, and that of albumen as six.

In conclusion, I would beg to express a hope that Dr Prout may soon be enabled to make known to the medical world the result of his important investigations upon those laws of chemical combination, " which appear to regulate not only the operations of the animal economy, but the whole material world."

December 1831.

---

* On the application of Chemistry to Physiology, Pathology, and Practice; Gulstonian Lectures, London Medical Gazette, June 25, 1831.

† Medico-Chirurgical Transactions, Vol. viii. ix.

ART. VI.—*Medico-Legal Examination of two Cases of Death from Injuries of the Head, involving important questions in Medical Jurisprudence.* By ALEXANDER WATSON, Esq. F. R. C. S. E.

CASE I.—On January 20, 1827, I was requested by the Sheriff of the county of Mid-Lothian to accompany Mr Liston and Mr Mackenzie at the inspection of the body of Alexander Clark, and report along with them as to the cause of his death.

Clark was a carter, about 25 years of age. Shortly after five o'clock on the morning of the 8th of January he had gone along with another man to an infamous house, kept by a man named Mackenzie, to get a dram. His companion left him, and was succeeded by two women of loose character, who picked his pocket of a purse containing about fifteen shillings. Clark snatched the purse from one of the girls; she immediately called out that she had been robbed, and Mackenzie came to her assistance. A scuffle ensued. Mackenzie fought furiously with Clark, threw him down, kicked him severely in several places, cut his nose with a blow, and turned him out of his house. In this scuffle Mackenzie tore the purse forcibly from Clark, emptied it of its contents, and put it into Clark's pocket as he was leaving the house.

Clark went immediately home and told his friends that he had been "robbed and murdered." He was confined to bed with the bruises he had received; but the medical gentleman who then saw him did not consider his life in danger.

On the 13th, he was able to go out for a short time upon business. But on the 11th, he complained to his friends that he felt contraction of the mouth, stiffness of the jaws, difficulty of swallowing, and dimness of the eyes. He could not take food on account of the contraction of his mouth and difficulty of swallowing.

On the 15th, necessity made him go out to his work; but he felt himself so unwell that he was obliged soon to return home. He was able to take a little spoon-meat, but, being unable to open his jaws, he could only get the spoon a short way into his mouth. He was obliged to go out again in the evening for half an hour to attend to a horse that was under his charge. When out he felt very unwell, and complained that he felt as if he would fall down. On his return home he went to bed.

On the 16th, his mouth was almost quite closed. Medicines could only be got into his mouth where a tooth was wanting. He was able to identify Mackenzie as the person who had injured him, and to make a declaration in presence of the Sheriff. He continued to become worse till the 19th, when he died, having been previously seen by Mr Liston and Mr Mackenzie. On the day subsequent to his death we made a careful inspection of his body.

Externally there was a small ragged lacerated wound upon the nose, at the lower extremity of the suture which unites the two nasal bones. There were also marks of contusion upon the right elbow and left hip-joints.

On dissection there were found several small portions of extravasated blood under the integuments of the head, particularly above the right eye. The brain was natural; the vessels filled with blood; some serum in the ventricles, and in spinal sheath. The posterior part of *fauces* was of a dark-red colour, from congestion of the vessels of the lining membrane. This appearance was distinctly circumscribed, and terminated at the upper end of the œsophagus, root of the tongue, and posterior part of the nostrils. The membrane lining the air-passages had a similar appearance, and contained a considerable quantity of fluid tinged with blood and purulent matter. The larynx was open and dilated; there was some congestion of lungs; but the abdomen was natural.

We reported to the Sheriff that Clark had died from "locked-jaw" (*tetanus;*) and that the appearances on dissection were not of themselves sufficient to account for his death.

An important question then occurred, whether the tetanus of which Clark died had been caused by the injuries he had received, or imprudent exposure to cold while suffering from these injuries, or partly from both of these causes? It will be observed that he received the injuries on the 8th of January. He did not go out till the 13th, while on the 11th he had complained to his friends of the tetanic symptoms. There was therefore no exposure to cold, or any other cause which could have occasioned tetanus, between the receipt of the injury and the time at which its symptoms first appeared. Though tetanus sometimes occurs from injuries in this country, it is by no means common; and it very rarely takes place from exposure to cold. We therefore stated as our opinions at the trial of Mackenzie, which took place on the 14th of March 1827, that Clark's death had been occasioned by tetanus, resulting from the injuries he had received on the 8th of January. The charge of assault was clearly proved against Mackenzie, who had inflicted the injuries. But the charge of murder was departed from by the public prosecutor, with the approbation of the judges; because the injuries Clark had received were not of a mortal nature, and had been inflicted without any intention of committing murder; and likewise, because locked-jaw was not a necessary or usual consequence of such injuries. The jury, therefore, returned a verdict of *culpable homicide*, and Mackenzie was sentenced to transportation for fourteen years.

Case II.—On the 16th of July 1831, Dr Christison and I proceeded, by warrant of the Sheriff, to inspect the body of Mrs Stevenson or M'Cormick, in order to report as to the cause of her death.

This woman had lived very unhappily with her husband and a daughter of his by a previous marriage. They were all much addicted to intemperance, and were people of degraded character. M'Cormick had served in the army, for which he received a pension. But, unfortunately when this was paid to him, he could not refrain from drinking to intoxication, so long as it lasted. His conduct at such times was very outrageous. In the brutal conduct of beating, kicking, and dragging his wife about by the hair of the head, his daughter joined him; and on the day previous to the death of his wife, he had been seen by several of his neighbours to beat and maltreat her. Several persons saw him give her severe blows with his fist on the head and face. In the evening she took refuge in the house of a neighbour, to whom she complained much of her head, and declared "they had murdered" her. Next morning she was seized with convulsions and coma, of which she died in a few hours. At the time she died, a student of medicine, who had been called to see her, several neighbours, together with her husband and his daughter, were present. In presence of these bystanders the husband and his daughter accused each other of having murdered the deceased, at the same time swearing at each other the most horrid oaths, and using the most shocking epithets.

On inspecting her body we found several marks of recent contusions on her face, head, and arm. The skull was not fractured, and was throughout three-eighths of an inch in thickness, being about three times the thickness of ordinary skulls. A slight bloody effusion covered the upper part of the right hemisphere of the brain, beneath the dura mater. At the anterior part of the middle lobe of the brain on the right side, there was a pretty thick coagulum of blood, which, when removed, appeared to amount in quantity to about half an ounce. The substance of the brain was firm and vascular; the lungs and heart natural, the latter coated with fat, and contained no blood; the arteries were natural; the kidneys small, and much diseased, having a mottled appearance, and changed in structure; the urine presented coagulated flakes on boiling; and the ovaria were enlarged, and converted into cysts filled with watery fluid.

Our report upon this case stated, that we had found several marks of contusion on the face, head, and other parts of the body, and an effusion of blood upon the brain sufficient to have occasioned her death; but that it was impossible for us to say whether this effusion of blood had arisen from violence or from natural disease. We also mentioned our having observed other parts of the body in a state of disease, but not of a nature to have caused sudden death.

At the trial of M'Cormick and his daughter for the murder of his wife, the case rested entirely on the medical evidence. Habitual maltreatment, and blows on the day before her death, were clearly proved against them. But the question came to be, Whether the effusion of blood which had caused her death had been produced by violence, or had arisen from natural disease and intoxication? Several circumstances strongly concurred to favour the conclusion of violence as the cause. These were,

1. The infliction of severe blows on the head just before the fatal symptoms came on, sufficient to have occasioned the effusion of blood on the surface of the brain.
2. External marks of violence on the head.
3. Effusion of blood from natural disease rarely takes place on the surface of the brain; and seldom at all without either disease of the brain or of its arteries.
4. The symptoms and appearances were precisely such as might have been expected from such blows as the woman had received.

In giving our evidence, therefore, we concurred in opinion, that the fatal effusion of blood on the brain *was more probably owing to the violence she had received than natural disease.*

We gave this opinion as medical jurists, called upon to aid impartially in the elucidation of the case. In such a case it could not have been more decided, but more especially in this one, on account of the drunken and irregular habits of the deceased. And the public prosecutor, with that laudable humanity and moderation which always characterize the administration of the laws of our country, departed from the charge of *murder*, on account of our professional opinion being uncertain. But, when taken along with the general evidence, which was very strong against the prisoners, the propriety of the decision come to may fairly be questioned. For, there were several direct proofs of violence, and none of natural disease, having occasioned death; the conclusion seemed almost irresistible: but this was for others to decide.—We performed our duty by stating the facts, our opinion, and the doubt which attended the case. The jury, however, had no alternative—they found both pannels guilty of aggravated assault, and they were accordingly sentenced to transportation for fourteen years.

The general history of both the above cases is taken from the evidence adduced at the trials before the High Court of Justiciary.

Edinburgh, 24th Nov. 1831.

ART. VII.—*On the Use of the Persesquinitrate of Iron in Diarrhœa, and some other affections of the Mucous Membrane of the Alimentary Canal.* By WILLIAM KERR, Esq. Surgeon, Paisley. Communicated in a Letter to Dr DUNCAN.

THE near approach of cholera lays an obligation on every practitioner who can, with any probable ground of success, propose an improvement in the treatment, or an additional remedy for that malady, to do so without delay, seeing that cholera still continues to be one of the most fatal diseases which has ever ravaged the globe. The medicine which I have to recommend is one which I discovered a few years ago, and which I have since employed pretty extensively in several affections of the mucous membrane of the alimentary canal, particularly diarrhœa with or without vomiting. In almost every instance this medicine was productive of the most decided benefit; and I think that several of the following cases will bear me out in saying, that in them it was more efficacious than opium; and I can moreover truly affirm, that few have occurred in which it did no good. A remedy of such power in diarrhœa will, I fondly hope, be not altogether inefficacious in cholera. By those who believe that the disease is one of the nervous system, this hope may appear groundless; but if in cholera the primary disease be, as the Editors of the Edinburgh Medical Journal* suspect, a peculiar affection of the alimentary canal, there is reason to expect some benefit from a medicine which, to an astringent power, unites the property of diminishing the irritability and tenderness of the mucous membranes, with which it comes in contact. I trust, however, that those who may peruse this paper will do me the justice to consider the evidence I bring forward; and if then they be not disposed to give the medicine which I propose a trial in the treatment of cholera, they will, I hope, be at least convinced that it is a remedy of considerable utility in the treatment of diarrhœa.

This medicine is the persesquinitrate of iron; but, for the sake of brevity, in the following pages I have styled it the nitrate.

It is made in the following manner: Take of small chips or pieces of iron wire an ounce and a half, nitric acid three ounces by measure; water twenty-seven ounces; muriatic acid one drachm.

Put the iron into an earthenware vessel, and pour on the nitric acid, previously diluted with fifteen ounces of the water. Set the vessel aside till the whole of the acid has united with the iron, so as to form a persesquinitrate; then decant the liquid from the portion of iron which remains undissolved, strain, and filter. Add the muriatic acid with the remainder of the water, or with as much of that liquid as shall increase the whole solution to thirty ounces.

---

* *Vol.* xxxvi. p. 408.

The solution is completed in a space of time varying from seven to twelve hours, according to the concentration of the acid and the thickness of the iron. If a less dilute acid be used, the time will be shortened; but in that case the heat evolved is apt to be so great, as to produce other combinations of the iron and nitric acid. I have always been in the habit of using rather thick pieces of iron; and the time required for the completion of the process is then from nine to twelve hours; but a quantity made lately with bell wire was completed in little more than seven hours. When the process is finished, the liquid has a red colour, so dark, that, viewed by reflected light, it seems almost black. The evolution of gas is then no longer perceptible. Three ounces of nitric acid of the usual strength (1.4) generally dissolve an ounce of iron, so that when the process is completed, a portion of the metal remains undissolved. The solution then consists entirely of the persesquinitrate of iron; and, if speedily decanted, it may be preserved in that state; but if allowed to stand for a few hours longer on the iron, it will undergo a farther change, gradually becoming converted into pernitrate and and protonitrate of iron. The first of these is insoluble, and renders the liquid turbid, and the latter, which remains dissolved, has not the medical properties which render the persesquinitrate valuable. Carbonate of soda throws down from the solution of the persesquinitrate a precipitate of a pure red colour; but if the process has been carried too far, such precipitate has more or less of a greenish tint. When the solution contains nothing but nitric acid and peroxide of iron, it slowly undergoes decomposition on standing; so that at the end of a few weeks the whole liquid begins to become turbid. The addition of some muriatic acid prevents this decomposition, and the quantity sufficient for this purpose is too small to affect the medicinal powers of the persesquinitrate. The solution, when rightly prepared, is of a beautiful dark red colour when viewed with transmitted light. Its taste is very astringent, and not at all caustic.

Several of the following cases are given somewhat in detail, in order to point out the affections in which I have found the persesquinitrate of iron useful.

Case 1.—A boy, at present, (Nov. 17, 1831,) nearly 7 years of age, from his infancy was subject to diarrhœa, attended with griping pain in the bowels, and headach. The diarrhœa was brought on by exposure to cold, fatigue, or improper food, and was so readily excited, that he was frequently seized every fortnight, and seldom longer than six weeks occurred without an attack. In the end of last June I was consulted, and advised five drops of the solution of the nitrate of iron to be given twice a-day in a wine-glassful of tepid water. After commencing the use of this medicine, he had only one attack of diarrhœa, which occurred soon after he began to take the nitrate, and was produced by imprudently eating a quantity of fruit. He has now got a good appetite, digests his food well, has become somewhat robust, and probably, in consequence of this change in the state of his health, has lost a craving for spirituous liquors, which he formerly had. Before I visited him, many remedies had been tried either without relief, or with very temporary benefit, though ample justice was done to their administration. Of these medicines, his parents remember tincture of rhubarb, laudanum, purgative enemata, and enemata consisting of starch and laudanum. Considerable attention had likewise been paid to his clothing and diet, and he had several times been sent to the country and to the sea-shore.

His parents often mention their surprise, that a disease of so long standing, and previously so obstinate, should have disappeared all at once, and that his constitution should have been renovated in so short a time by the use of the nitrate. In mentioning their astonishment, however, they at the same time express their most decided conviction that this medicine removed his disease.

Case 2.—A gentleman, 24 years of age, in the end of May and beginning of June 1831, had diarrhœa which, notwithstanding the use of two or three grains of opium daily, continued rather troublesome. At the end of a fortnight he commenced taking fifteen drops of the solution of the nitrate twice a-day, and after five doses was quite cured. He has since had several slight attacks of diarrhœa, all which have been speedily removed by that medicine. In these attacks the motions of his bowels were not very frequent; but griping pain was pretty constant, and so severe as to prevent him from attending to his business with any pleasure. The pain on all these occasions had lasted from twenty-four to thirty-six hours before he had recourse to the nitrate; but, in the course of a few hours, generally two, after swallowing fifteen, twenty, or twenty-five drops of the solution, the pain was sensibly diminished; and another dose usually removed both it and the diarrhœa.

This gentleman happened to visit a neighbour of his who had been confined three or four days with diarrhœa, and, sensible of the benefit which he himself had derived from the nitrate of iron, he administered thirty drops of it to his friend, who next day was quite cured.

Case 3.—In the beginning of March 1831, A—— R—— a child, at that time nine months old, began to be affected with diarrhœa, which occasionally troubled him, without, however, materially affecting his health. About the middle of May his strength began perceptibly to decline, and his flesh to waste; and in the beginning of June vomiting was added to purging. He did not become seriously ill till the 13th of June, and early in the morning of the 15th he suddenly became so much worse that his parents dreaded the near approach of dissolution, and sent for me. I attempted to check the disease by a mixture containing Battley's sedative liquor, and by increasing his clothing. These measures, however, were insufficient; and on the 17th the stools occurred for a considerable part of the day at the rate of one every hour, or even half hour, and took place whenever he was moved, for instance, when lifted out of his cradle. The stools were watery, of a greenish colour, had an extremely offensive smell, and never voided without pain. Vomiting did not take place so frequently as purging, but seldom occurred without being accompanied with a motion of the bowels; and the matter vomited had generally a tinge of bile. He voided less urine than in health. His strength had now sunk exceedingly, his countenance had assumed a very exhausted appearance, a dark circle surrounded his eyes, the space around his mouth had a somewhat livid colour, and when asleep his eyelids remained half open. The temperature of the body was unequal, and the cool parts of it were frequently covered by a cold sweat. The pulse was frequent.

On the 18th, finding him still declining, I administered an *enema*, consisting of eight ounces of warm water and nine drops of the solution of the nitrate of iron, which he retained. As soon as it was administered he became calm, easy, and soon fell asleep, in which state he remained for two or three hours. On leaving him I directed a dose of sedative liquor to be given as soon as he should awake, and that medicine to be afterwards administered more liberally than formerly. For several days succeeding the 18th, never less than two, and frequently three drops (=5 and 7½ of laudanum,) were given every four hours; and on one or two days he had twenty drops of sedative liquor each day. These large doses had so little effect in checking looseness, that his parents several times expressed their doubts whether they were productive of any good. When not very uneasy, a dose of sedative liquor soothed him, and caused him to sleep; but when very restless, and much purged, he did not become easy till an enema, containing nitrate of iron, was administered. This enema was only beneficial when retained, which was generally the case; it then *always* put a stop to looseness, dispelled fretfulness, soothed him, and sleep frequently followed. One morning purging began between five and six o'clock, and notwithstanding the administration of three drops of sedative liquor at six, and other three between nine and ten, it continued at the rate of a stool every hour till twelve o'clock, when an enema with nitrate of iron was given and retained. This instantly stopped the diarrhœa, and he soon fell asleep. The benefit derived from *enemata* in this case is attributable solely to the effect of the nitrate of iron, because his parents, before they consulted me, had repeatedly administered without benefit both *enemata* containing warm water and castor oil, and *enemata* consisting of starch and laudanum. For a week or more previously to my first visit, an *enema* of the last description was given almost daily. The *enemata* with nitrate of iron consisted at first of from nine to twelve drops of this medicine and eight ounces of warm water; in a few days, however, the number of drops was increased to twenty-four. For some time an enema was given twice a-day, and for a considerable time afterwards once a-day. Latterly the *enemata* were occasionally rejected; and in this case it was found to be a considerable improvement to give a second as soon as the first was returned.

After recovering considerably, he had, in the month of July, a very dangerous relapse, in consequence of his clothing not being sufficiently warm. On one day during this illness he was so very weak that his eyes were glazed. Notwithstanding enemata with nitrate of iron were administered, and sedative liquor given as formerly, the disease became worse, till the cause was discovered, and his clothing increased. The present paper is not written to illustrate the necessity of warm clothing in bowel complaints; but he who, in diseases of this kind, neglects it, will often find that all his prescriptions are fruitless till he take measures to maintain a comfortable warmth of the body.

My little patient, from a state of very great emaciation and weakness, has now improved very considerably, and has gained a good deal of flesh. His bowels, however, are still disposed to be rather too open, and a slight diarrhœa on an average takes place once a-week, but is instantly removed by an enema with nitrate of iron. His parents have long discontinued the use of sedative liquor, from a conviction of its inutility. To this patient the nitrate of iron was exhibited solely by enemata, because he is not yet weaned; and in young infants this medicine, by curdling the milk in the stomach, is apt to produce vomiting.

Case 4.—On the 31st of August 1831, I was called to visit a child fourteen months old, who for three weeks had been harassed with vomiting and purging. For several days before my visit, the vomiting had occurred at the rate of nine or ten times every twenty-four hours, and the purging, on an average, once every hour. The only remedies previously administered were brandy toddy, from which no perceptible benefit was derived, and a single dose of laudanum, which was almost immediately vomited. I prescribed a mixture containing opium, but the child vomited it as soon as it was administered. I then directed an enema, consisting of two ounces of warm water and ten drops of the solution of the nitrate of iron, to be given. This was retained, and the desired effect was produced, for neither vomiting nor purging occurred for four or five hours afterwards. Next day, the disease having again increased in severity, the enema of nitrate of iron was repeated, and all the symptoms of the disease were thereby removed for twelve hours. Only two or three enemata of this kind were afterwards required, till the symptoms which indicated them ceased to return. The cure, however, was not entirely trusted to the nitrate of iron, for as soon as the vomiting was stayed, the assistance of opium was had recourse to. The removal of the vomiting and purging was accomplished in little more than a week; a febrile state remained for ten or fourteen days longer.

This child's bowels have since her illness been rather disposed to be too loose, and she is often purged several times every twenty-four hours. The purging attacks her during the night as well as the day, but if four drops of the solution of nitrate of iron be administered, her parents can with certainty predict that the diarrhœa will not trouble her before next morning. The nitrate of iron is now given to this child by the mouth; and, though she is not weaned, it does not produce vomiting.

A short time ago, a sister of this child, 3 years of age, was seized with diarrhœa, which troubled her to the extent of six stools a-day. After it had continued two or three days, her mother administered by the mouth four drops of the solution of the nitrate of iron, which diminished the purging, and a second dose given next day removed it altogether.

Case 5.—In the month of April 1831, A—— W———, a child eleven months old, began to be affected with diarrhœa, and, notwithstanding the administration of sedative liquor, the dose of which was gradually augmented, the disease increased. For a week preceding the 25th of July, he was purged very frequently, some days as often as twenty times. The purging was not uniform in its frequency, five or six stools generally occurring in an hour; and not unfrequently the next five or six hours passed without a stool. At this period two or three enemata, consisting merely of warm water, were given on as many different days, but without diminishing the diarrhœa in the slightest degree. On the 25th of July, I directed an enema, consisting of twelve drops of the solution of nitrate of iron and four ounces of warm water, to be given once or twice daily. The effect of these was very marked,—indeed, it was not till after such enemata began to be administered that the purging was checked. Immediately after having received an enema, from being fretful he always became easy pleased, very generally fell asleep for five or six hours. If the enema happened any day to be neglected, he became manifestly more peevish and sleepless, and the diarrhœa became troublesome. His parents say that sedative liquor, given when he was fretful, made him better tempered, and produced sleep, but had very little effect in checking looseness, the cessation of which they attribute to enemata with nitrate of iron; indeed, they think that it is to these enemata that he is indebted for his life. After some time it was found necessary to diminish the bulk of the enemata one-half, the number of drops of nitrate of iron remaining the same as formerly, on account of those of the original size producing some degree of oppression.

In the end of September, when the weather began to become colder, his old flannels were exchanged for new, and this alteration produced a very great amendment in his health. Previously to this, though the diarrhœa was quite trifling, neither his strength nor flesh increased; but after he was more warmly clothed he gained flesh and strength almost daily.

During his illness he was very fond of brandy toddy, of which he drank some almost every day. The toddy made him more cheerful, but had no other perceptible effect.

Case 6.—A lady in an advanced stage of phthisis became very much harassed by diarrhœa. This attacked her severely on the 28th of March 1830, and during the three succeeding days, though she took 200 drops of laudanum daily, she had a stool whenever she attempted to move or lift her head; and an hour seldom passed without two or three motions of the bowels occurring. On the evening of the 31st, two enemata, containing altogether two teaspoonfuls of the solution of nitrate of iron, were given, and in the course of the next twenty-four hours, though she only swallowed seventy drops of laudanum, she had no more than two stools. Her appetite, which had previously been nearly gone, increased very considerably. The disease in her lungs, however, did not permit her ultimate recovery. She died not long afterwards.

Case 7.—A man, aged 39, in the beginning of 1830, had a psoas abscess, which, after being punctured, gradually healed. But in the spring of 1831, a deep-seated abscess, which was subsequently opened, formed near the top of the other thigh. From this period, however, he never enjoyed good health. A tendency to diarrhœa and vomiting came on, and his appetite became very bad; indeed, during the whole summer scarcely a day passed without vomiting occurring once or oftener, and perhaps not a day in which he could take food with pleasure. In the beginning of October the vomiting and purging became more severe, and his appetite altogether failed. A week after this exacerbation commenced I was consulted, and advised ten drops of the solution of the nitrate of iron to be taken twice a-day. During the whole of the spring and summer he had found it necessary to take two or three grains of opium daily, in order to soothe uneasiness. Diarrhœa did not seem to him to be allayed by the opium, and he suspected that it increased his sickness.

After commencing the nitrate of iron he only vomited once. In the course of two days vomiting and purging left him; and in a few days longer he could take food not with reluctance, as formerly, but with a pretty keen appetite; indeed, he was better and easier than he had been for eight months previously. At this time he sent to inform me, that nothing ailed him except debility and œdema in his legs. This favourable change, however, only continued a fortnight; his strength had been exhausted beyond the possibility of recovery, and he died a few weeks afterwards.

In the following case of disease *depending* on diarrhœa, it will be observed, that a very considerable time elapsed after the commencement of every indisposition before any decided symptoms of the affection of the bowels manifested themselves. May not an inference be drawn from this, that in cholera the existence of symptoms previous to any sensible affection of the bowels does prove that these symptoms do not arise from the state of the alimentary canal.

Case 8.—In the end of June 1831, I was consulted by Mrs R—— 32 years of age, for the following complaints. At the end of uncertain periods, varying from three to eight weeks, she is seized with diarrhœa, which is preceded for the space of from half a day to two days by general chillness, drowsiness, debility, headach, and nausea. As soon as diarrhœa commences, the drowsiness, headach, and nausea cease. The looseness sometimes does not extend beyond two or three stools, occurring in quick succession; at other times it continues for two or three days, but though prolonged thus far, she has not more than three or four stools daily. Griping in the bowels exists for two or three minutes before every stool, and ceases as soon as the motion takes place. After the cessation of diarrhœa she has no complaint but weakness, and soon becomes as well as before an attack. Attacks of this kind are brought on sometimes by fatigue, but chiefly by cold, and whatever disorders her stomach.

The complaints now described began five years ago after an attack of cholera.

I prescribed ten drops of the solution of nitrate of iron twice a-day.

October. She is now pretty well, the looseness and the accompanying train of symptoms have ceased to recur, and her appetite and digestion are greatly better. These improvements commenced as soon as she began to use the nitrate ; indeed, since that period she has not had a single attack of diarrhœa.

Several authors deny that in cholera the primary disorder consists in an affection of the bowels, because in a number of cases vomiting and purging are less prominent than some other symptoms. The following narrative, however, will show how slight a derangement of the bowels may affect the system considerably.

Case 9.—In the month of September 1830, I was consulted by a gentleman, 32 years of age, for the following complaints. Since his earliest years he has been subject to frequent attacks of headach, which have hitherto come on and ran their course uncontrolled by any remedies he has employed. The headach generally commences in the forenoon, and for a few hours previously to its attack there is some degree of nausea, so that he has little appetite for breakfast. About twenty or thirty minutes before pain is felt, an indistinctness of vision is observed. The headach very rapidly reaches its acmé. It is pretty commanding, but cannot at any time be said to be severe. While the pain continues he is giddy, and somewhat sick, and his face is paler than natural. The recumbent posture relieves him, but the pain is not banished till he has enjoyed a night's sleep, and, fortunately, he always sleeps well. For many years his appetite has not been good, and this, added to the frequent attacks of headach, has rendered him far from robust. On account of his want of bodily vigour, a small quantity of wine taken daily might appear proper; but a wine-glassful taken at once produces a sensation of oppression, and is therefore injurious. He thinks, however, that half a wine-glassful strengthens him, and therefore generally takes this quantity daily. His bowels often become rather loose, but the diarrhœa is never severe, and is not attended with griping. Slight as the last symptom is, it exerts an important influence over his health, for headach is scarcely ever felt except when the bowels are too loose.

Believing that the tendency to diarrhœa formed the foundation of his complaints, I directed him to take ten drops of the solution of nitrate of iron twice a-day. He soon found that this quantity made him too costive, and therefore took ten drops only once a-day.

July 23d 1831. After commencing the nitrate of iron a decided improvement took place in his health; the tendency to diarrhœa and headach ceased, his appetite improved, and, consequently, his strength increased Formerly he was rendered uncomfortable by headach once or twice every week, and from the same cause was confined to the house or to bed a day or two every month. For a considerable time past he has scarcely felt headach, and since he began to use nitrate of iron he has not been confined from his business a single day, with the exception of a short time last winter, and at that time he had rather inconsiderately discontinued the nitrate of iron.

Case 10.—The subject of the following case is a young woman, 17 years of age. The symptoms of her complaints are so nearly the same with those of the preceding patient that I need not detail them. The attacks of headach and accompanying diarrhœa often occurred as frequently as twice a-week, and were never absent longer than a fortnight. Her complaints had existed three years before the middle of last July, when I was consulted. I directed ten drops of the solution of nitrate of iron to be taken twice a-day.

Nov. 18th. Since she commenced taking the nitrate her bowels became quite regular, and she has scarcely felt the slightest headach. In the beginning of last month, however, thinking herself quite well, she discontinued taking the medicine, and some time afterwards her old complaints returned, but were again soon banished by resuming the use of the nitrate.

When my attention was first directed to nitrate of iron, I was engaged in investigating the nature and treatment of epilepsy; and it was not till serious fears began to be entertained that this country might be visited by cholera that I turned my attention to the application of this medicine to diseases which have their seat in the mucous membrane of the stomach and intestines. On this account my collection of cases of the latter description is perhaps rather too limited. I could, however, now add several instances where an irregular state of the bowels was the exciting cause of epilepsy, and where the nitrate of iron, by correcting the one, removed the other. Such instances would no doubt add much to the credibility of what I have stated respecting the medicinal properties of the nitrate of iron; but as a detail of epileptic symptoms is quite foreign to the object of this paper, I shall not at present trouble you with them. There is one case, however, of this description, which is so interesting in several points of view, that I cannot refrain from relating it. The purely epileptic symptoms I will pass over as slightly as possible, and merely call your attention to the state of the bowels.

Case 11.—June 4th 1831. Mr L———, a farmer, aged

40, till the month of February last, enjoyed tolerably good health. From his boyhood he has been troubled with heartburn, which, however, did not prevent him from becoming very robust, and full in his habit of body.

In February last he was seized with an epileptic fit, for which he was bled to the extent of thirty-six ounces. Instead of regaining his health, however, he has gradually become weaker. Since the fit his bowels have never been regular; costiveness being alternated with looseness. When costive the feces are dry and hard. This state is soon succeeded by diarrhœa, in which the stools are very liquid, like whale oil, and of a colour which he can hardly describe, but in which a dark or dirty greenish colour seemed to prevail, putting him in mind of the feces of a cow when seized with diarrhœa. Since the period mentioned, he has scarcely had any stools of an intermediate consistence. The state of costiveness generally continues for a few days, and the loose state shorter, or from ten to twenty hours. When the loose state takes place the stools are very frequent, as if some obstacle confining the fluid feces had been suddenly removed. When costive, he has a sensation of uneasiness and tension in the abdomen, which is almost insufferable. On examination a tumour is felt immediately beneath the epigastrium. He cannot bear this tumour to be pressed firmly. His appetite is very trifling, and his digestion so bad that he cannot say what kind of food agrees best. He has had no epileptic fit besides the one already mentioned. He feels himself so unwell, and his strength declining so fast, that he expresses a decided conviction, that, if not relieved, his disease will soon prove fatal. I advised him to take ten drops of the solution of the nitrate of iron twice a-day.

July 15th. In the course of forty-eight hours after commencing the use of the drops, the tumour beneath the epigastrium became sensibly softer, and the sensation of distension from flatus diminished. The part which was hard is now as soft as the rest of the belly; it has, therefore, most probably been a quantity of hardened feces. Since he began to take the nitrate of iron the returns of diarrhœa have gradually become more distant; when they do return they are much more moderate, and, in the intervals, the costiveness is much less. Formerly he was attacked with diarrhœa at least twice a-week, and in some weeks three or four times; now a fortnight generally elapses between the attacks. Before he consulted me, whenever costiveness came on he had recourse to calomel, and some other medicines, with the nature of which he is unacquainted, but which were prescribed by his family surgeon. Since he began to take nitrate of iron he has not found any laxative necessary.

August 12th. He called to day to obtain a supply of the solution. Since last report an attack of looseness did not come on till two days ago; its occurrence at that time he is disposed to attribute to disuse of the nitrate. His stock of this medicine was finished on the third, when he procured from an apothecary in the nearest town to his residence some of the tincture of the muriate of iron, which, however, seemed to him to be destitute of the beneficial properties of the nitrate.

For a considerable time past he has been free from heartburn, and he now considers himself pretty well.

Oct. 12th. After last report he improved very much, and during the harvest was so well as to be able to do nearly the work of a robust man in binding sheaves. Since that period, however, his strength has rather declined, his food has lain heavy in his stomach, and he has had occasionally some degree of giddiness. These unpleasant symptoms seem to be owing to a tendency to costiveness, which has been gradually increasing without alternating looseness. On the 8th of this month he remembers that he was very costive, and early on the morning of next day he was seized while asleep with an epileptic fit, succeeded by what is styled by Prichard *Leipothymia*.

The immediate cause of the present relapse seems to have been a loaded state of the bowels, but the cause of the increased tendency to constipation does not appear so obvious. Immediately before the last indisposition, he had occasion to go from home for several days. At this time he had only a few doses of my medicine remaining; and thinking that it would be better to have a mixture of it and the muriate of iron, than in the course of a day or two to have none whatever of the nitrate, he purchased some of the tincture of the muriate, which he added to the small remnant of my drops. This mixture, however, did not succeed as he wished, for he soon began to get worse. In a few days afterwards he received from me a quantity of, what I intended to be as formerly, the persesquinitrate of iron, but which, from the undissolved iron having remained too long in it in the process of preparation, was very muddy; that is, consisted in a great measure of protonitrate of iron. The new supply of drops did not as formerly bring his bowels to a natural state, and he continued to get worse, as I have already mentioned. The coincidence between the return of his complaints in the first place, with the want of the nitrate of iron, and secondly, with his using a different preparation of this medicine, is very striking, and suggested the propriety of giving him a solution of the nitrate of iron, which shall contain only the persesquinitrate, without any mixture, protonitrate or pernitrate.

Oct. 21st. As soon as he began to use the solution of the persesquinitrate, the feelings of heaviness of food in the stomach, and giddiness, which for three weeks had existed in a greater or less degree, ceased, and for several days he has felt himself quite well. His bowels are now natural.

Some time afterwards I had a letter from him, in which he states that he continued to enjoy good health.

In the commencement of this paper, I have stated my belief that nitrate of iron, besides an astringent quality, possesses the property of diminishing the tenderness of the mucous membranes with which it comes in contact; in support of this opinion, I may refer to the case I have just given, in which heartburn of long duration was cured by it. I could give several instances of the same affection unaccompanied with other disease removed by the same remedy, but these, I suppose, would be deemed superfluous.

From the experience that I have had of nitrate of iron, it seems to me to be more or less useful in almost every case of diarrhœa. There may be some cases in which its efficacy is not evident, but I flatter myself few or none in which it is hurtful. I have never found it of any use in dysentery, or in the diarrhœa which succeeds typhous fever. This may have arisen from the doses administered not being sufficiently large, or perhaps from the nitrate of iron not being suited to cases of this description.

When cholera is epidemic in a country, nitrate of iron may probably be very beneficial as a preventive, in removing slight diarrhœas, which are then very prevalent, and which are apt to terminate in cholera. There are a considerable number of individuals who have a greater or less tendency to diarrhœa. Nitrate of iron will in most cases go far to remove this, and thereby diminish the liability to cholera. I have advised a number of my patients, whose bowels are easily affected, to adopt the precaution of taking this medicine; and though only a few days have elapsed since some of them began to take it, I believe that all of them have now less tendency to diarrhœa.

Writers on epidemic cholera mention, that, as soon as the first evacuation of the bowels takes place, the patient experiences an excessive degree of exhaustion. In reading histories of cases of the disease, it will likewise be remarked how much the weakness of the sufferer is increased by every motion of the bowels. In confirmation of this, I would particularly refer to Mr Annesley's thirteenth case. In that case the sense of sinking, and the aggravation of the other symptoms which took place after every evacuation of the bowels, is very striking, and ought to suggest reflections on the propriety of much purging. In dysentery, which is in some measure a kindred disease, nothing increases the danger so much as frequent motions of the bowels; and recent experience has demonstrated, contrary to the opinion of Dr Cullen, and the most eminent of our late practitioners, (Practice of Physic, § 1080,) that he who chiefly depends on purgatives is pretty certain, if the case be severe, to produce a fatal termination. In dysentery, too, it is well known that the bowels are not emptied while the stools continue frequent, and that a proper evacuation of their contents is not obtained till they act in a more moderate and healthy manner. If the numerous doses of calomel and other purgatives recommended in cholera are intended to remove the contents of the intestines, I am disposed, with all due deference to those who propose them, to believe that in this they are mistaken, and that, as in dysentery, these medicines will only accelerate the fatal event which it is the object of the practitioner to prevent. This was the opinion of Sydenham, who compares the administration of purgatives in cholera to an attempt to extinguish fire by means of oil.—(*De Cholera Morb. anno* 1669.) If in dysentery frequent motions of the bowels are highly injurious, can it be supposed, setting theories as to the nature of the disease aside, that in cholera they will be beneficial? In dysentery the exhaustion produced by purging is great, but in cholera it is still greater. In severe dysentery the mode of treatment which allays the inordinate action of the bowels cures the disease; and in cholera, if the same object were kept steadily in view, perhaps the same desirable result would follow.

In the usual cholera of this country, the vomiting, purging, and cramps may in very many cases be removed by the judicious application of warmth; but as this will probably soon be illustrated by the individual to whom I am indebted for this knowledge, I leave the subject in his hands.

We very naturally expect that opium will be useful in checking purging; but we are informed by Annesley, and more recently by Lichtenstadt, that little reliance can be placed on this medicine. Opium in some of the preceding cases had very little or no effect in checking diarrhœa; yet in these cases the disease readily yielded to the nitrate of iron given by the mouth or in enemata. Diarrhœa constitutes one of the elements of cholera, and a medicine which has proved so useful in the one will not, I imagine, be useless in the other. As the latter disease is much more severe than the former, much larger doses of the nitrate than I have mentioned in this paper will probably be required. In some complaints I have given a teaspoonful three or four times a-day, and I have known half an ounce swallowed without any other consequence than a considerable degree of costiveness. Indeed, from the known properties of the metal in combination, I have no suspicion that any dose will prove dangerous.

A metallic nitrate has already been employed in the treatment of cholera, viz. the subnitrate of bismuth. The nitrate of iron is a safer medicine. Several other, perhaps all metallic, nitrates have more or less the property of diminishing tenderness in the mucous membranes, with which they come in contact.

Paisley, 17*th November* 1831.

ART. VIII.—*Case of Excision of the Elbow-Joint.* By DAVID KERR, Esq. Surgeon, Aberdeen. Communicated by MR SYME.

ALEXANDER GRAY, aged 16, was recommended to me in the beginning of May 1830, with disease of the left elbow-joint of ten months' standing. The swelling extended a considerable way both above and below the joint. Suppuration had taken place over the inner condyle of the humerus, and in various places below the joint. The ulcers had degenerated into fistulous openings; and through these a probe could be passed to the lower end of the humerus, which was in a carious state. There was a constant gnawing pain in the joint, shooting down towards the wrist, greatly aggravated by pressure or the slightest motion. His general health was much impaired; his pulse 120 and feeble; he had night perspirations; and, in short, was far advanced in hectic fever. Such were the leading symptoms of the disease when he was placed under my care. To give a detail of its history and treatment from the commencement were superfluous. It may be sufficient to state, that he ascribed the origin of the disease to an injury which he received on the joint when on a voyage to Jamaica, and that it gradually continued to gain ground, notwithstanding a variety of treatment by different practitioners, till at length his health became so much affected, that the hospital surgeon, under whose care he then was, deemed it necessary to recommend amputation,—an expedient, however, to which he refused to submit, and accordingly left the hospital.

It was soon after this that he applied to me. To improve his general health he was sent to the country, where he continued to gain strength for several weeks; but after the beginning of June his strength again began to decline, and by the middle of July had sunk so far, that it was evidently necessary to have recourse to an operation, for there was no reason to suppose that he could long bear up under a disease so irritative, and of so untractable a nature. Excision of the joint was therefore resolved on, and, as soon as the nature of the operation and its probable consequences were explained to him, he readily gave his consent. The operation was accordingly performed on the 23d July, in the following manner.

The position of the patient was that recommended by Moreau, so that the diseased arm hung over the edge of the table, presenting its posterior and outer surface. The brachial artery being compressed by an assistant, an incision was made posterior, but as near to the course of the ulnar nerve as could be ascertained from the diseased state of the parts, commencing about two inches above, and terminating immediately below the joint. A similar incision, parallel to the first, was made on the outer side of the arm; and a transverse section, which divided the tendon of the triceps immediately above its attachment to the olecranon, connected the inferior extremities of the two longitudinal incisions. The flap, consisting of the integuments, diseased cellular tissue, and lower extremity of the triceps, was dissected from the surface of the bone. The extent of disease in the humerus being ascertained, the soft parts adhering to its anterior surfaces were separated from it by the scalpel, which was then passed between the bone and flexor muscles, and retained in that situation till the bone was divided by the saw over the handle of the scalpel, which served as a protection to the soft parts beneath. The removal of the lower portion of the humerus was completed by raising and detaching it from its remaining connections. The articulating surfaces of the bones of the fore-arm being thus completely exposed, they were found denuded of their cartilage, exhibiting the true carious appearance, and in every respect as much diseased as the humerus. It being therefore necessary to remove the upper extremities of the radius and ulna, the longitudinal incisions were extended about two inches below the joint, and the flap separated, so as to lay them bare. The whole of the ulna above the coronoid process was then removed by the saw, and the head of the radius by the forceps. The diseased parts being thus removed, the wound was sponged out, and as no vessel required the application of a ligature, the flaps were laid down and secured to each other by stitches.

The patient was placed in bed, with his arm supported on a pillow, and simple dressings applied. By the end of three weeks the hectic symptoms completely subsided, and from that time his health improved rapidly. The soft parts being much diseased, the wound healed up slowly. Several of the old sinuses continued to discharge a little for months, and one of them at this date affords a little serous exudation; but from the appearance which it has lately assumed, there is not the least doubt that, in the course of a few weeks, it will be completely cicatrized. The thickening about the joint has entirely subsided, and he retains an arm, which, though necessarily shorter and less perfect than the other, bears no comparison in point of utility to a stump. He can make very considerable exertion with it in lifting weights, can raise it to his head by the power of its own muscles, and employ it for many useful purposes, and, what is still more gratifying, it is daily increasing in strength and utility.

Aberdeen, *20th August* 1831.

Art. IX.—*Pathological and Practical observations on Infantile Remittent Fever.* By Robert Lewins, M. D. Fellow of the Royal College of Physicians of Edinburgh, &c.

In the study as well as in the practice of medicine and surgery, it has been too common to devote time and attention exclusively to diseases and operations which by their nature astonish, or by their effects appal us; whilst others, in reality, more important, from their being of every day occurrence, have been very much overlooked, or altogether neglected.

Infantile remittent fever is one of this description, to which I would direct the attention of my professional brethren. This is a disease of very frequent occurrence, although not always recognized as a distinct malady. The symptoms by which it is characterized were noticed by Hoffman, Lieutaud, and Sauvages, and each of them has given it a different name. Its true nature, however, was not until of late understood, as the whole train of symptoms observable in its course was attributed to the existence of worms in the bowels; and the disease was by the profession, as it still is by the vulgar, denominated a worm fever. Worms, it is true, frequently produce similar symptoms; but in many cases which come under the care of the physician no worms are found to exist. When, therefore, the disease we are about to consider is found to be co-existent with worms, these, occasionally present, are to be considered as being only accidental; or, at most, as an exciting cause of a peculiar train of morbid phenomena.

While infantile remittent fever was still considered as the effects of worms alone, Dr George Armstrong of London published an accurate account of it under the name of the Hectic Fever of Teething, which he observed is attended by all the symptoms of worms, except their actual appearance.

I have stated that the presence of worms is by no means necessary to constitute the disease, and it may be recorded with equal truth, that the circumstance of dentition is not a constant attendant, as the same series and order of symptoms are observed to take place in children not under the influence of dentition.

In the history of this disease, as in many others, we have an example of the pernicious influence of a too hasty nomenclature; and of the impropriety of naming a disease from any one of its alleged causes.

So long as this disease was known by no other names than those of the worm or teething fever, the attention of the physician was necessarily directed to the expulsion of the worms, or the liberation of the teeth; and, when in spite of his best endeavours, neither could be made to appear, he must often have been made sensible of the error of his diagnosis, and of the insufficiency of his means.

A worm fever, where no worms were found to have existed, or a teething fever, where no teeth were about to appear, or where the process of dentition was already completed, must have often puzzled and perplexed medical practitioners, so long as these addle names were retained.

To Dr Butter, I believe, the profession is indebted for the suggestion of a more appropriate name, which, by dissolving the association of a certain train of morbid symptoms that constitute the disease, and the supposed causes, has directed physicians to a more perfect knowledge of its nature and treatment.

The accuracy of Dr Butter's history of this disease, and the truth of his observations, so far as they went, have been confirmed by those who have prosecuted the inquiry. But, strange as it may appear, there are, even now, medical practitioners, by no means deficient in the knowledge of their profession, incapable of recognizing it as a distinct fever.

The name given to the disease by Dr Butter has been approved of, and retained by succeeding authors; and additional light has been thrown upon its nature by the observations of Underwood, Pemberton, Burns, and Mackintosh.

In the following observations, I shall employ the term infantile remittent fever, although I think a more appropriate one might easily be found.

The fever of which I treat has properly been divided into two kinds; the acute and chronic.

To the acute I direct my attention more particularly upon the present occasion.

It generally happens, that, for some time before an attack of remittent fever manifests itself, a derangement of health is observed; the patient frequently changes colour, loses his appetite, he becomes dull, fretful, and drowsy; his breath is offensive, and he is often observed to pick his nose. Sometimes a slight cough takes place, which is greatly increased during the progress of the disease, and is attended with hurried or laborious respiration. If the patient can speak, he complains of pain in the head or belly; the latter is generally larger than usual; the bowels are for the most part costive; sometimes, however, a diarrhœa takes place. In the course of the day there are several accessions of fever, which become more violent towards evening. During the night the patient is hot and restless, often starting and moaning in his sleep.

After a longer or shorter period a more violent paroxysm of fever takes place, which is preceded by a cold fit, and often by vomiting. The pulse becomes very rapid, beating from 150 to 170 or upwards in a minute. The heat of the body is greatly increased, and the patient is very restless; while the headach and pain in the belly become more urgent, and the sleep more disturbed.

The bowels, which from the first had been costive, now perhaps become obstinately constipated,—and in some cases convulsions occur. Several exacerbations are sometimes observed in the course of the day; but always towards night an aggravation of symptoms is perceptible.

In the remissions the patient is often so well as to be able to direct his attention to surrounding objects, but the pulse does not often fall below 100.

Through the whole course of the disease, there is not the least desire for food, nor is the patient in general harassed with thirst. If forced to swallow aliment, it is generally rejected by vomiting; the digestive organs appear totally unfit to perform their office, as the ingesta not rejected by vomiting pass off by the intestines, after they have been acted upon by purgatives, without having undergone the usual change.

The stools are generally of a green or a dark colour, of a slimy consistence, and very offensive smell. Worms are sometimes voided.

The tongue is often clean, occasionally dry and very red, sometimes, however, it is furred, but not covered with the thick dark coloured or black coating observable in fevers of the typhoid type.

As the disease advances, the patient often becomes incapable of articulating, and in some cases complete aphonia has been observed; the loss of speech sometimes continues for several days after the violence of the fever is subdued. Paralysis of one or other of the extremities is occasionally observable, and I have seen the little sufferer unable to call into action the muscles of one leg or arm, while those of the opposite side remained unaffected. I have never known the paralytic affection permanent.

During the continuance of the fever the surface of the body is dry and parched, but sometimes a clammy moisture may be observed on the hands and neck.

The abdomen is always tumid and tense, the heat there and about the loins very great, while, at the same time, the feet and legs are colder than natural.

Just before the exacerbations take place, at whatever time they occur, the attentive observer may commonly remark great coldness in the feet and legs, while the face is perhaps flushed, and the belly and loins excessively hot.

The urinary secretion is very variable, generally scanty and thick; at one time of the day becoming cloudy when cold, but depositing no sediment; at other times it becomes white, with a chalky precipitate. Dr Armstrong observes that it has often a peculiar smell like that of the cat. In some cases the urine is copiously secreted and natural in appearance. Dr Butter has seen it of a deep orange tinge.

Nature does not seem to have fixed any limit to the duration of this fever. Some cases terminate favourably in a few days, others linger for many weeks; but in general the duration of the acute disease does not exceed a fortnight. A crisis is seldom observed in the infantile remittent fever, but a moisture more or less copious, attended with relaxation of the skin, has appeared at its termination. A diarrhœa has sometimes appeared to be critical.

The urine, according to Dr Butter, at the termination of the disease, deposits a copious sediment, and the body assumes a straw colour. But the fever oftener gradually remits, the exacerbations becoming more mild and less frequent. And when we find the abdomen soft, the tumefaction subsiding, the stools returning to their natural state, and the patient enjoying sounder sleep, we may expect a solution of the disease, especially if the heat of the body be diminished, and more equally diffused, if the patient become sensible, and the appetite return. A greater degree of fretfulness is sometimes a forerunner of returning health.

The disease does not often terminate fatally, and recovery sometimes takes place after the exhausted state of the patient or the formidable nature of the symptoms had precluded all hope.

When the disease does terminate fatally, the patient is either snatched off suddenly by convulsions, or gradually sinks worn out by the febrile excitement; or under such circumstances as show that the mucous membrane of the intestines has suffered; or coma, dilated pupil, and strabismus and subsultus afford to us painful proofs of fatal effusion in the brain. The infantile remittent is certainly a fever arising from a topical affection, and it is not propagated by infection.

All physicians whose attention has been particularly directed to this disease are of opinion that it has its proximate cause, a disordered state of the digestive organs.

Whatever tends to derange the chylopoietic viscera is a predisposing cause of infantile remittent fever; but I believe the actual kind or degree of gastric or intestinal derangement that constitutes the proximate cause yet remains to be proved. We do know, however, that vitiated secretion exists, and local affections of an inflammatory nature in the parts concerned, as well as in others more remote, particularly in the brain, supervene and sometimes prove fatal.

The contents of the chest occasionally suffer from actual inflammatory affections, although it oftener happens that the cough is merely sympathetic. I have frequently found a blister applied to the chest, and the patient subjected to unnecessary torture in a case of this disease, where a purgative only was required.

Infantile remittent fever is sometimes mistaken for idiopathic hydrocephalus, and has been confounded with typhus, enteritis, hepatitis, and pneumonia.

To hydrocephalus it certainly has often a very striking resemblance, and it is frequently difficult to distinguish the one from the other. Indeed there is reason to suppose that the physician has often taken credit to himself for the cure of hydrocephalus, when the disease was no other than the one which now occupies our attention.

Notwithstanding the occasional very striking resemblance between the two diseases, there are circumstances which will enable the experienced practitioner to distinguish them. I may here remark, however, that, to accomplish this object, too much stress has been laid upon the appearance of the eyes, the very obstinate constipation of the bowels, and the appearance of the stools, which cannot collectively, and certainly not separately, be depended upon as certain marks of hydrocephalus. Dilated pupil, or even strabismus, and obstinate torpidity of the bowels, which have been considered so truly characteristic of hydrocephalus, are occasionally met with in infantile remittent, whilst the appearance of the stools is nearly the same as is observed in the former disease.

The signs by which we may be enabled to distinguish these diseases may be known, I conceive, from the following observations. The infantile remittent is not necessarily attended with vomiting,—a symptom always present in the first stage of hydrocephalus; in it, too, vomiting is either produced or increased by the patient being placed in an erect position. The coldness of the extremities, the regular exacerbations, the state of the patient during the remissions, the excessive heat of the abdomen and pain upon pressure, characterize remittent fever. In both diseases the sleep is much disturbed, but the piteous and frequently loud screaming appears to be peculiar to hydrocephalus, while a low muttering only attends the remittent fever of infants.

The history of the case, also, and the appearance of the gums, will greatly assist us in our diagnosis in many cases, teething being a frequent exciting cause of this fever. We ought also to pay particular attention to the effects of purgatives, which frequently afford more decided relief in infantile remittents than in hydrocephalus.

The fever of which we treat is often mistaken for typhus. This, however, ought not to be a common occurrence. The early history of this disease, the appearance of the tongue, the more complete remissions, and the evident connection, in the first instance, with gastric and abdominal derangement, will enable the physician of even limited experience easily to distinguish the infantile remittent from typhus. It does not require much skill to discriminate between this disease and pneumonia, enteritis, or hepatitis, with each of which I have known it confounded. A very slight attention to the time in which the lungs, bowels, or liver have become affected, will readily enable any one to perceive that the inflammatory action occasionally at work in these organs is an effect and not a cause, and that it is almost always of the subacute kind.

The indications of cure may be reduced to four heads.

1*st*, To remove the remote cause of the disease.

2*d*, To restore the healthy action of the chylopoietic viscera.

3*d*, To obviate the effects produced by the disease on important organs, as the brain, the lungs, the bowels, &c.

Lastly, To restore the exhaustion of the *vis vitæ*.

It is a wise indication of cure in every disease to remove the remote cause when that is in our power; and this is more especially necessary in the diseases of children, as, from the delicacy of the infantile frame, constitutional derangement is more readily the effect of slight causes. A cake of milk, for example, in the stomach, will sometimes produce convulsions.

It is the duty of the physician in every case of this disease to examine the state of the mouth, and when he finds marks of local irritation there, to scarify the gums freely. The relief which often immediately follows will show how much the fever had been connected with the state of the gums. Any other remote cause, if in our power, ought also to be removed; but we must not expect that the disease shall instantly cease. We have other indications to fulfil; the remote cause, however, being removed, our other remedies will be administered with more effect.

Attention ought generally to be next directed to restoring the healthy action of the chylopoietic viscera; but this depends upon the stage of the disease, and upon the effects it may have produced.

If the brain be affected, to *it* our attention must immediately be directed, in the manner which will be noticed in speaking of the effects of the disease, which may be denominated secondary.

In the present state of our knowledge, the mere abdominal functional derangement is best remedied by the judicious administration of purgative medicines, which must be given so as to effect a complete evacuation of the bowels. It often happens, that to accomplish this is by no means easy; and it is truly astonishing to observe the large and repeated doses of active purgatives which have been administered without moving the belly, or at most producing very scanty and unnatural stools. When this is found to be the case, we must not persist in the administration of the more active kind, otherwise, instead of mitigating the severity of the disease, we shall increase its violence. Under these circumstances, a spasmodic affection of the intestines exists, and frequently a degree of inflammation upon their inner surface, both of which will be increased by drastic purgatives. But it is absolutely necessary to have the bowels evacuated, moderate doses of phosphate of soda, castor-oil, rhubarb, and magnesia, are the most appropriate medicines. In this state of the disease, when there is an urgent necessity for evacuating the bowels, great advantage will be derived from fomenting the abdomen with warm water, or a decoction of chamomile flowers and poppy heads. The fomentations ought to be continued for half an hour, and repeated after a longer or a shorter interval, as the circumstances of the case require. After each fomentation, some place much confidence in the application of emollient and anodyne liniments to the abdomen by friction. The *Tinctura saponis cum Opio*, *Tinctura Saponis*, and *Oleum Camphoratum*, are most employed. Besides the administration of purgatives, injections will in many cases be found very useful.

Perhaps a combination of opium, or some other antispasmodic, with purgative medicine, may be advantageously prescribed.

If the continuance of the disease depend upon derangement of function and a loaded state of the bowels alone, it generally happens, that after their complete evacuation the febrile exacerbations abate, and the other morbid phenomena gradually disappear; the appetite returns,—the patient becomes capable of directing his attention to objects around,—and now enjoys undisturbed repose. But we have not always the satisfaction of witnessing such a speedy and desirable termination of the disease. If the fever have been very violent, or improperly treated at the beginning, effectual relief is not obtained by the administration or complete operation of purgatives; effects having been produced which may be termed secondary, to obviate which the attention of the physician must now be directed.

The parts which are most apt to be affected in the way referred to are the mucous membrane of the intestines, that of the lungs and the brain, all of which are very apt, during the continuance of the infantile remittent fever, to suffer from the effects of inflammatory action, the proper management of which constitutes the principal difficulty in a great proportion of cases of this disease. The propriety of general blood-letting has been questioned, as there is seldom considered any necessity for depletion in its early stages, or until the sufferer has become exhausted. The soundness of this doctrine I am disposed to question; and when it is remembered how decidedly efficacious general blood-letting, judiciously practised, is known to be, by late experience, in many diseases in which it was supposed to be inadmissible, I am induced to think that it may occasionally be resorted to with advantage in this fever, where the excitement in the whole system is so great, and the inflammatory diathesis in a degree so conspicuous.

It is unnecessary to detail minutely the local remedies necessary under the circumstances referred to. Leeches, fomentations, rubefacients, and blisters, are applied with benefit to the abdomen; and the same means, with the substitution of cold applications instead of fomentations, are the remedies by which we attempt to check the progress of the inflammatory action in the brain or its investing membranes.

It has already been hinted that general blood-letting would probably be a valuable remedy in violent cases of infantile remittent,—and there can be no doubt that all other antiphlogistic means, short of venesection, are necessary, when it does not yield readily to the administration of purgatives.

The debility which is produced by the continuance of the disease, or by the treatment, will be best obviated by nourishing, but not stimulating, diet. Great caution is always necessary in administering wine,—and the physician ought never to forget that the patient's strength will generally be restored without its aid.

✓

ART. X.—*Cases and Observations in Medical Jurisprudence.* [Continued from Vol. xxxv. 353.]—*Case X. On the effects of Opium-eating on Health and Longevity.* By R. CHRISTISON, M. D. Professor of Medical Jurisprudence and Police in the University of Edinburgh, &c.

IT is singular how very little is known by the medical profes-ion of the effects of the practice of eating opium or drinking audanum on health and longevity. On the occasion of the Jury Court Trial which will form the subject of the present aper, a large proportion of the practitioners of this city were pplied to by the parties for information, and several were examined on the trial; yet it will be seen, that the information communicated consisted of little more than presumptive statenents and matters of opinion, and especially that no one had ny direct experience on the subject. This ignorance might xcite a little surprise, when it is understood that the habit really revails to a very considerable extent both among the lower orlers and better ranks of society,—were it not well ascertained that hose in the better ranks who are addicted to the use of opium n general conceal it sedulously from their medical attendants, while in the lower orders an opportunity is seldom afforded of bserving its effects with accuracy, as it is often united with the ractice of excessive drinking.

The circumstances of the following trial will show that it s an object of some importance to supply this defect in melico-legal toxicology. Insurance companies and their melical advisers ought to make up their minds on the question,—which, so far as my scanty means of inquiry enable me to give an opinion, is far from being so easily answered as might on first consideration be thought,—whether the practice of using opium tends materially to shorten life; because the practice is indubitably not uncommon among the class of persons who are accustomed to effect life insurances. And if it be resolved to hold the opium-eater's life uninsurable, which I apprehend most will be inclined to do, then both companies' physicians and medical referees generally ought to be aware, that the habit may exist where it is not at all suspected by medical attendants or intimate friends, and that it is by no means in general to be detected by the phenomena to which, according to popular belief, it usually gives rise.

In September 1826 the late Earl of Mar effected an insurance on his life with various insurance companies, and among the rest, with the Edinburgh Life Assurance Company for the sum of L. 3000. The policy of insurance was held by the banking establishment of Sir W. Forbes and Company in Edinburgh as security for money lent to the Earl. In September 1828 Lord Mar died of jaundice and dropsy at the age of 57; and his insurances were therefore claimed by his creditors. But the Edinburgh Life Assurance Company then received information that he had been for many years in the habit of using laudanum to excess, and was in the regular practice of doing so at the time he effected his insurance; likewise that he was in the habit of drinking freely; and farther, that he lived a very sedentary life. Yet in the schedule usually filled up by applicants and their referees, information was given which led the Company to consider his habits to be certified as both temperate and active; and certainly no hint was given to them of the important circumstance, that his Lordship was addicted to the use of opium. The Insurance Company therefore refused to pay the sum specified in the policy; and Sir W. Forbes and Company raised an action to recover payment.

As the presiding judge allowed in his charge to the jury that the case laid before them on the trial involved no questions of law, but was to be decided by the rules of common sense; and as all the particulars of cases of this nature are full of instructive lessons to the practitioner, whose duties, as medical referee on the part of insurance companies, as well as on that of his patients, have now become highly important, and nevertheless are but little understood by many;—I shall give an outline of the whole evidence, general and medical, and then offer some remarks on the effects of opium-eating on health and longevity, and on the decision given in this case, together with the principles of that decision,—neither of which, in my opinion, can be exactly reconciled with physiological facts or the inductions of common sense.

It appeared from the general evidence, that in reply to queries put by the insurance company to the Earl, he stated that, at the time of effecting the insurance, he was "in perfect health,"—that his "general state of health was good,"—that he "had never been afflicted, or subject to insanity, gout, asthma, dropsy, liver-complaint, consumption, or spitting of blood, fits, hernia, or any other disorder tending to shorten life." It likewise appeared that, on reference made by the Earl to a private friend, the company were informed his general health was good,—he had not, to this gentleman's knowledge, any disorder which tends to shorten life,—he took moderate exercise, and was temperate in his living,—and generally that no reason was known to this referee why an insurance on his life would be more than usually hazardous. And farther, it appeared that Dr George Wood, the medical officer of the company, and likewise the Earl's acquaintance, but not his medical adviser,—for he had none,—stated as medical referee, that the Earl's general state of health was good; that he believed him not to be subject to any disorder tending to shorten life; that he knew no reason why an insurance on his life would be more than usually hazardous; that he was "active in his habits, and temperate," But it seems that in filling in replies to the queries contained in the company's schedule, this gentleman,—while he replied favourably to the special question in regard to habits, "Are they sedentary or active?" and likewise to the other special question, "Are they temperate or otherwise?"—neglected replying to the general question, "Can you give any and what information respecting his habits?"

Sir W. Forbes and Company, the pursuers, maintained, that even admitting, which, however, they did not,—that the Earl was addicted to the vice of opium-eating in a degree calculated to shorten life,—nevertheless the insurance company having accepted the life without the *general* question as to habits having been answered, had departed from the usual practice and precautions of insurance companies, and must therefore be understood as having accepted the life, as it stood, at a venture.

But independently of this plea, which it will presently be seen was considered by the presiding judge an important one, the pursuers proceeded to establish their case by supporting the insurance certificates through means of various witnesses, such as Lord Mar's factor, coal-manager, gardener, game-keeper, and woodman, as well as a medical man who once or twice attended him, and three private friends who saw him frequently before and after the insurance was effected. The evidence of these witnesses tended to prove that the Earl was temperate in his living, never appeared intoxicated, or as if under the influence of narcotic drugs, and had no complaint but rheumatism of old standing, which did not prevent him from taking exercise to the extent of one, two, or even three miles at a time.

The medical gentlemen, and one of the Earl's private friends, Mr Stein, knew him familiarly in 1812; and they stated, that at this period he was subject to rheumatism, for which Mr

Stein was aware he occasionally took a little laudanum. From that time neither of these gentlemen saw him till 1825; when he appeared to them not more altered than an advance of thirteen years in life would fully account for. After the spring of 1826, both of these witnesses, as well as two other friends, Lord Abercrombie and Mr Miller, saw him frequently till about two months before his death; and they agree in stating, that at first his habits appeared active enough, as he frequently visited his garden and plantations, attended county meetings, and rose early,—that he was a shrewd man of business, and given to study,—that his intellects were clear and acute, his memory, originally powerful, unimpaired, and his disposition cheerful, unless when the state of his affairs was talked of, when he always seemed desponding and depressed. Towards the close of 1826 and beginning of 1827, however, they were all sensible of a change in his habits. On succeeding his father, he conceived his estate, though heavily burdened, would leave him a clear income of L. 2000. But gradually he found his expectations had been too high, till at length, in the course of 1827, he discovered he was not worth a farthing. During this period he gradually secluded himself more and more from society of every kind, was little out of doors, lay long in bed, and even went seven days without being shaved; yet till within two months of his death his health and appearance did not appear to these gentlemen to suffer.

From first to last none of his friends could give any account of his habits, as he saw no company. Mr Miller alone, who occasionally dined with him, could state, that he did not remark he drank more than other men. None ever perceived the slightest sign of excitement or depression, or stupor, as if from the use of narcotic drugs,—not even the medical gentleman, who occasionally called in the forenoon when not expected.

In corroboration of this evidence the Earl's gardener, coal-manager, gamekeeper, and woodman declared, that in 1826, before, as well as after the time when the insurance was effected, he attended closely to his affairs, walked much in his garden and plantations, superintended the operations of his workmen for an hour or two every forenoon, and sometimes gave them assistance in raising weights which were too heavy for them; and none ever remarked any stupor or other sign of the operation of narcotic drugs; but all observed his gradual change of habits, and increasing gloom and neglect of himself afterwards, as the true state of his affairs was gradually opened up.

The pursuers therefore concluded, that his health was broken up, not before the insurances were effected and from opium-eating, but at a later period, and simply and singly by the gloomy state of his affairs; and they denied that he was addicted to the use of laudanum, or, if it was so, that his health suffered in consequence.

The preceding evidence appears to me interesting;—not that it tends when thoroughly sifted to prove the pursuers' case; but because it confirms, what will appear from the general observations in the sequel, that, with a little pains, it is easy for a man in the better ranks effectually to conceal for years from his friends confirmed habits of opium-eating, with all its consequences; for that the Earl was much addicted to this habit was amply substantiated by the following evidence for the defendants.

On behalf of the Insurance Company, then, it was proved, that he had confessed to his housekeeper his having been in the practice of taking laudanum for thirty years; that about the close of 1825 and the early part of 1826, he had purchased at the rate of forty-nine grains of solid opium and one ounce of laudanum daily; and that during the rest of 1826, as well as the two subsequent years, he purchased opium chiefly in the form of laudanum at the rate of two, two and a-half, and three ounces daily. The pursuers wished to have it thought, that he only swallowed moderate doses of laudanum, by maintaining, that he might use part of it as an embrocation, and that the defendants could not substantiate his actually swallowing large doses. But there was no evidence whatever of any of it having been used externally. It was clear he took it often, since, by the evidence of his housekeepers for twelve years before his death, he was in the habit of swallowing some always before he went out to walk, before going anywhere in the carriage, whenever he was irritated, and at night when he went to sleep. And it was equally clear, that he had acquired the practice of swallowing large doses, for one of his housekeepers, who used occasionally to give it herself when he went to bed, gave a table-spoonful at a time. These witnesses also proved, that even before the period when the insurances were effected, his health appeared to them indifferent; that he was seldom free of rheumatism, and often confined to bed with it; that he had sometimes spasms in his stomach; that when he first got up in the morning, he was so stiff as to require to lean heavily with his hands on his arm-chair to raise himself; and that he generally appeared listless and in low spirits. In corroboration, several female servants deposed, that early in the autumn of 1826 he always appeared to them in low spirits and ill health; that his appetite was so indifferent as to be satisfied with a single partridge or small chicken served three days successively at dinner; and that he often took brandy in the forenoon, and after dinner sat alone drinking spirits and water till late in the evening, when he became not unfrequently intoxicated. In farther corroboration as to his constitutional state of health, *Dr Abercrombie* deposed, that when he visited him in 1825 for stomach complaints, he found him with a constitution evidently enfeebled and broken down, although he had not any definite complaint.

This evidence certainly appears to me fully to establish the existence of a confirmed habit of using laudanum in excess, and likewise to prove presumptively, that from this or some other cause Lord Mar was infirm in health at the time of effecting the insurances in the autumn of 1826. The apparently contradictory evidence brought forward on the part of the pursuers will be easily reconciled with these conclusions, when attention is paid to the effects of opium-eating on the health, which will presently be explained.

On the trial several physicians in Edinburgh, namely, Drs Abercrombie, Duncan, Alison, Maclagan, and myself, and also Mr Macfarlan, a surgeon and apothecary,—were examined on the part of the Insurance Company as to the influence of this habit on the health. All agreed, that it must tend to injure the health and shorten life; one witness even considered that it would render a life more than " doubly hazardous ;" but all admitted, that they had scarcely any direct experience in the matter. Mr Macfarlan alone knew one person, a female, who used laudanum to the extent of about two ounces daily for many years, and who died about the age of sixty,—of what disease he could not remember. In my evidence, I stated the circumstances of several cases which had been communicated to me by a friend, which rather tended to show, that opium-eaters may reach a fair age; but, at the same time, I gave my opinion, founded on its operation in disordering digestion in moderate doses, that it must generally injure the health and shorten life.

The Lord Chief-Commissioner in summing up the evidence, charged in favour of the pursuers. He stated that the case involved no question of law, but several points to be decided by common sense;—in reference to the silence of the medical referee on the *general* question as to habits, he thought it a very material circumstance that the Company referred to a medical man and then made the insurance without an answer to a question, which is material in making an insurance and fixing the premium; and observed, that in that case the jury should consider whether an individual who is going to insure is bound in honour and honesty to disclose a secret habit, if the insurance company acts in such a manner as to make it appear that they do not look upon it as material. The evidence, he continued, brought forward by the defenders went to prove, that the habit of using opium in excess was a material circumstance for the company to know as tending to shorten life,—that this habit existed in the present instance,—that it existed to such an extent as to be important and to render it obligatory on Lord Mar to disclose it,—and that its effects were apparent in his constitutional health. But was all this satisfactorily proved? The habitual use of opium was believed by all the medical witnesses to be injurious to life; but it was worthy of attention that one of the witnesses, who alone could state special facts on the subject, had mentioned instances of opium-eaters who had lived to a good old age. As to the existence of the habit, it was proved that Lord Mar got opium mysteriously in considerable quantities; but was it proved that he also took it in so great quantity as to constitute a pernicious habit?—that he took it to such an extent as to be an important circumstance for the Insurance Company to know, and one which he was bound to reveal? It rather appeared, that Lord Mar *alone* knew the extent to which the opium was taken. And as to its effect on his health, several witnesses speak of Lord Mar as neither debilitated in body nor in mind, and to his habits being those of other gentlemen at the time the insurance was made. Since he had no habit, then, of such extent as to have any apparent effect on body or mind, could its effect be so material as to require being disclosed? The question for the jury to decide on the whole was, whether the state of health into which he fell subsequently was occasioned in any considerable degree by the use of the drug, or by the condition of his affairs, or by both together.

Such was the substance of the Chief-Commissioner's charge. The jury decided in favour of the pursuers, by finding the Insurance Company liable.

OBSERVATIONS.

Before making the remarks which follow on this case, as it is usually, though I hope often erroneously, considered, that a medical witness is apt to feel a bias in favour of the views maintained by the party who consult him,—it may be well to state, that I was consulted by both parties, and indeed in the first instance by the party in whose favour the jury gave their verdict.

On a dispassionate view of the whole facts I must say I cannot find in them any reason sufficient to bear out the judge in his charge, or the jury in their decision; and it is perhaps material to add, that, so far as I have been able to learn, there has not been found in this city, where there are many medical men who have paid much attention to the principles and affairs of insurance companies, a single individual who considers the verdict to have been founded in reason or supported by the evidence.

The first question in the case,—whether the company were guilty of negligence to such an extent as to relieve Lord Mar from the obligation of revealing a pernicious habit?—being, as the judge allowed, a question of common sense and not of law, I must be permitted to observe, that, where a medical referee, while neglecting to answer a general query as to habits, nevertheless answers all the special queries which can arise out of the general one, an insurance company would not in my judgment be guilty of negligence to such an extent, as to render them liable, if the life accepted under such information should turn out to have been at the time, as I am satisfied was proved in Lord Mar's instance, so clearly hazardous that no insurance company with a correct knowledge of the facts would have accepted it.

That the defenders established the life of his Lordship to have been of this kind I believe few on perusing the evidence reported above will doubt. From the testimony of witnesses who were always nearest him, I consider it was proved that, at the time the insurance was affected, his health, from one cause or another, had long been in an infirm state; and this conclusion is strongly supported by the sentiments of Dr Abercrombie, the only physician who visited him recently before; by whom it was stated that his constitution appeared broken down in 1825, but without any specific disease being present. That this did not particularly strike the attention of other witnesses may be easily accounted for, on considering that these were his personal acquaintances or out-of-door servants, the former of whom saw him seldom, and none of whom saw him except at a time, when, if the habit of opium-eating existed, it was extremely probable that he was in the state of tranquillity and slight stimulation, which will presently be seen to be the ordinary effect of each dose in those who use it habitually.

The second question,—did the habit of taking opium exist to such an extent as to make it important that the company should know it, and obligatory on Lord Mar to reveal it?—is one which I am inclined to think the presiding judge would not have viewed in the light in which he actually did regard it, had he been made better acquainted with the effects of this habit. Although he admitted there was evidence of the mysterious purchase of large quantities of opium, he doubted whether there was any evidence of its having been really taken internally in such quantities. And, supposing the habit of using it occasionally to have existed, he seemed to consider that there was evidence of the habit not having reached a pernicious height, because to personal friends and out-of-door servants Lord Mar presented none of the effects usually believed to arise from such a practice.

Now, had the presiding judge been aware of the importance of a special fact deposed to by one of the witnesses, he would not, I am inclined to believe, have said there was no evidence of opium having been taken to a great extent,—to an extent proportional to the quantity purchased. One of the housekeepers who sometimes gave it to him with her own hands said she gave it in the dose of a table-spoonful, that is half an ounce, which he swallowed at once. No one could safely swallow this quantity, which is six times the largest and twelve times the ordinary medicinal dose for unaccustomed persons, without the long and frequent practice of using it in gradually increasing doses. And as this appeared to be not an unusual dose with him, and there was also evidence of his taking commonly more than one, indeed several in the course of the day, the whole quantity purchased amounting to two and a-half, and sometimes three ounces daily, would seem to be satisfactorily accounted for as having been swallowed,—especially in the absence of any proof of his having used it often externally,—a circumstance which his servants could scarcely be ignorant of, if it existed.

Neither do I conceive the presiding judge would have held, that evidence of the habit not being such in degree as to be a material circumstance for the Insurance Company to know, was constituted by the assertions of the Earl's private friends and out-of-door servants, that in their presence his state and habits appeared those of other gentlemen,—had the Court been made aware of the peculiar effects of the opium-eater's dose, which are in general widely different from what unprofessional persons as well as even most medical men have been led by the vague statements of eastern travellers to believe. It will be seen from what will presently be said of the operation of opium on persons addicted to it,—that in this country at least the usual effect of the opium-eater's dose is neither to throw him into a state like the excitement of intoxication from wine and spirits, nor to induce for some time heaviness and stupor,—but simply to remove dullness and depression,—to make him alert in his occupations and conversable in his intercourse with others,—to occasion, in short, a state of mind and body which no one would suppose, at all events no one not aware of the habit would suppose, indicated anything unusual in his condition at the time. Now was it not sufficiently proved, or at all events extremely probable, that Lord Mar, who saw few friends and these but seldom, and almost entirely in the forenoon, who went out little even to his neighbouring grounds, and that too only in the forenoon, would take care, provided he had contracted the habit of using opium in excess, to resort on these occasions to the customary means of tranquillizing himself, and making him fit for the intercourse of society?

The third question to be considered is the general one, whether the habit of opium-eating is detrimental to health and longevity? On this point it was stated above that several physicians in Edinburgh were examined on the trial, who all considered the habit very injurious; but that few special facts were known to the witnesses; and that these few rather countenanced the supposition that a fair proportion of opium-eaters reach an advanced age. In the present place I shall consider the question independently of the trial, because some facts have come under my notice since it took place, which it will be convenient to imbody here in one view with the rest.

It does not necessarily follow that the habitual use of narcotics must tend to shorten life. The practice of snuffing, smoking, or chewing tobacco, is not believed to have any such effect. It is true that the much more injurious and more permanent effects which every repetition of a dose of opium produces on the digestive organs and on the nervous system, supply a stronger presumption of ultimate injury to life in the case of that drug, than exists in the instance of tobacco. But even these circumstances must not be too easily assumed as sufficient grounds for the belief that the practice of using opium in excess tends to shorten life. For it is well-known that some disturbed states of the nervous system, such as hysteria, may exist for a long time, and that the functions of digestion may often be long and seriously disturbed by ordinary stomach complaints, without life being materially shortened. It is necessary then to appeal to special facts.

I have not been able to find any facts of the least value on the subject in medical records. The following cases, however, have been communicated to me by several of my friends, in whose information I can place reliance.—1. A young lady of five-and-twenty has taken it largely for fifteen years. It was first administered secretly by her nurse to keep her quiet and save trouble; and the unhappy lady was subsequently compelled to keep up the practice for her comfort. She enjoys good health.—2. A female, a patient of mine in the Infirmary, a martyr to rheumatism, took it for ten years previous to her fortieth year in the quantity of a drachm daily of solid opium. She then gave it up. Six months afterwards she was attacked with jaundice; subsequently she was several times severely ill of rheumatism; and she died in her forty-third year of consumption. This woman, however, led a licentious life from an early period.—3. A well-known literary gentleman who has taken laudanum with some intermissions for twenty years, and occasionally to the extent of nine or ten ounces daily, has now attained his forty-fifth year. He is spare in form, looks older than he is, but is capable of undergoing a good deal of bodily fatigue, and enjoys tolerably good health so long as he takes sufficient exercise. His allowance when I had last an opportunity of conversing with him was about nine drachms of laudanum daily.—4. A lady in this city, after drinking laudanum to excess for upwards of twenty years, died about the age of fifty. No information could be supplied of the disease of which she died.—5. A lady of the same age takes about three ounces daily, and has used it for many years. She appears to enjoy good health.—6. A lady, about sixty years of age, has taken it above twenty years, and is in good health.—7. A charwoman, who had been in the daily practice of drinking two ounces of laudanum for many years, died at the age of sixty. The gentleman who has stated this fact, does not remember what disease she died of, although he dissected the dead body.—8. An eminent literary gentleman, I am informed, has been in the habit of taking laudanum since he was fifteen; and his daily allowance has sometimes been a quart bottle (twenty-six ounces) consisting of three parts of laudanum and one of alcohol. Enormous as this dose may appear, I am assured the fact is well-known to his acquaintances. He is about sixty years of age, and enjoys good health.—9. A lady of seventy, now alive, has taken about half an ounce of laudanum daily for nearly forty years. She enjoys tolerable health, and every year travels great distances to visit her friends.—10. An old woman of eighty died a few years ago at Leith, after taking about half an ounce of laudanum daily for nearly forty years; and she enjoyed tolerable health all the time.

These cases undoubtedly show that a certain number of opium-eaters may attain a good old age. But this circumstance will no more justify the conclusion that a fair proportion of them do so, than the parallel fact that drunkards often attain old age would bear out the conclusion that drunkenness is on the whole not inimical to longevity. The probability is, that many persons die at an early age of the effects of opium-eating, whose habits are never heard of, simply from the circumstance that they die young, before their secret is detected. The cases now succinctly related, then, are given rather with the hope of inciting others who have better opportunities to make farther inquiries, than of conveying practically useful information. And I fully anticipate the result, that this habit will be eventually found not less destructive than the vice of drinking spirits. I cannot bring myself to think, that the habitual use of a drug which produces such permanent narcotic effects as opium, disorders subsequently the digestive functions in so great a degree, leaves those who use it habitually in so miserable a state during the intervals of using it, as appears from their own confession, and leads obviously to emaciation and a worn-out elderly appearance at an early period of life, can be consistent in general with the enjoyment of health, and the chance of an average prolongation of the term of human life.

It was remarked above that very erroneous notions are entertained by most unprofessional and many medical persons of the immediate effects of a dose of opium on those who use it habitually. These notions appear to be derived from the statements of Eastern travellers, who have in all probability given an exaggerated view of the facts. It is in consequence supposed that in general much excitement is in the first instance produced, in the midst of which every individual yields himself up to extravagant acts and expressions, corresponding with his ruling passion. Whether these statements be correct or false, I am at all events convinced, from the inquiries I have made on the subject, that such effects must be extremely rare in this country. According to the information communicated to me from various quarters, and confirmed by what I have myself witnessed, the state of the opium-eater, while under his dose, is often not at all different from that of an ordinary person of active habits, cheerful disposition, and liveliness of ideas. From what I have myself witnessed, I am quite prepared to believe that in many instances, when the opium-eater is under the influence of the drug, no one could possibly have any suspicion of the fact. This is abundantly shown by the facility with which the habit may be long kept secret. In case sixth, the lady's medical attendant was so completely ignorant of the habit existing, that, on being summoned to her aid on account of an attack of diarrhœa, he ordered an ordinary dose of opium, and was first warned of the true state of matters by the apothecary, to whom the prescription was taken, and who had supplied the drug for her daily use. In case ninth I have taken some pains to ascertain the fact, that some of the lady's most intimate friends are not at all aware of her having fallen into the habit. In case third I can state from personal observation, that even after being told of the habit existing, no one could discover it from the gentleman's appearance, conversation, or acts. I am farther inclined to think, that in many persons unaccustomed to use opium, this drug, when it does not induce sleep or produce disagreeable idiosyncratic effects, occasions tranquillity and brilliancy of ideas; and that such effects will be often experienced, when its soporific influence is resisted by an exertion of the will. In all such instances, and notoriously in all opium-eaters, the stage of elevation is followed by one of gloom, depression, and loss of appetite. But the opium-eater usually takes care not to be seen at that time; and if he is compelled to appear in society, he alters the face of matters by renewing his dose.—We see, then, how the habit of using opium in excess might exist in the case of Lord Mar, and yet none of his ordinary acquaintances remark at any time "excitement, depression, or stupor, as if from narcotic drugs."

In giving an account of the evidence in Lord Mar's case, I have not taken notice of an attempt which was made, on the part of the pursuers, to prove that he could not have taken much laudanum, because he did not appear to have used much laxative medicine. Less weight, indeed, was attached to this circumstance on the trial than had been at first intended by them. The real fact is, that it constitutes no presumption whatever against the habit of opium-eating existing. From my inquiries it appears, that a considerable proportion of persons addicted to the use of opium, contrary to what would be expected, from its well-known influence on the intestines, require little laxative medicine, and some scarcely any at all. The subject of case third merely requires a little rhubarb on an average once a-week, as he finds that exercise counteracts any constipating effect the opium may have. The subject of case fifth requires no laxatives. The charwoman, case seventh, got no laxatives in the shop where she got her laudanum. Case ninth, on the contrary, is an instance of the necessity of constant laxatives; and probably this is the more general rule, although it is obvious there must be many exceptions.

PART II.

CRITICAL ANALYSIS.

Art. I.—*A Practical Medico-Historical Account of the Western Coast of Africa: embracing a Topographical Description of its Shores, Rivers, and Settlements, with their seasons and comparative healthiness; together with the Causes, Symptoms, and Treatment of the Fevers of Western Africa; and a similar account respecting the other Diseases which prevail there.* By James Boyle, M.C.S.L. Colonial Surgeon to Sierra Leone, Surgeon R. N. &c. London, 1831. 8vo. Pp. 423.

It is a singular example of the little attention which the most important of all considerations in colonial policy receives, that many, if not most, of the measures required for the continuance, protection, and extension of these establishments, are in their execution attended with a prodigious and extravagant waste of human life. Of all the places in the habitable globe in which this pernicious policy is seen in its most perfect shape, none can be compared to the Western Coast of Central Africa. The insalubrious qualities of these regions were originally clearly pointed out in 1768, by Dr James Lind of Haslar Hospital, who described almost every locality with such perfect accuracy as if he anticipated the periodical havoc which the simplicity of posterity might cause among the European visitors and settlers. Yet the insatiable love of gain and a passion for colonization has prevailed over the lessons of experience, and the warnings of the physician. Not only have we witnessed attempts to colonize such places as the islands of Bulam and Fernando Po; but Senegal and Sierra Leone continue to receive their periodical offerings of European victims; and neither the annual certainty of sickliness and death, nor the rapidity with which diseases cut off every fresh supply, can intimidate their successors from attempting the same course.

Mere volunteers to such places it is idle to pity. But those who are deluded into the notion of being colonists in a land so insalubrious and inimical to the European constitution, that sickness prevails at least four or five months annually, it is certainly proper to apprise of the difficulties they have to encounter. If the writings of Lind, Schotte, and Winterbottom, had been duly studied by those who recommend the West Coast of Africa, they never could have done so without the charitable hope of getting rid of superfluous population. It is possible, however, that the experience of these authors is not sufficiently known to those to whom the accomplishment of colonial measures is delegated. If this be the case, the present work is one which cannot be too strongly recommended to their attention.

The northern equinoctial region of the African continent presents on its western boundary a line of coast with which our commercial relations and pursuits have required us to obtain considerable acquaintance. Between the 20° and 12° of north latitude, or between Cape Blanco in the north and Cape Roxo in the south, this coast is directed westward, or runs nearly north and south. This line, from the circumstance of its lying to the north and west of that of the Guinea or Leeward coast to be immediately noticed, and from which the wind blows during the greater part of the year, is also known by the name of the Windward Coast. South of Cape Roxo the coast bends to the east as far as Cape Palmas, and therefore presents an aspect to the south west along a line extending from the 12th° to between the 4th° and 5th° of north latitude. Beyond Cape Palmas it runs eastward in a sinuous waving line, forming a series of shallow bays as far as the considerable indentation denominated the Bight of Biafra, the whole directed south ; and beyond the latter point it resumes its southward course, bending slightly to the east, and continues this as far as the Cape of Good Hope. This south-west and southward coast, also known under the name of the Leeward coast, is further distinguished into tracts more minutely, as the Grain or Malaguetta coast, the Ivory coast, and the Gold coast.

The whole of this region being comprehended within the northern half of the torrid zone, possesses those climatic peculiarities by which the tropical regions are distinguished. Instead of the year being divided into the four successive seasons of spring, summer, autumn, and winter, it is distinguished into two seasons only, the wet and the dry, the former marked by frequent heavy torrents of rain, with thunder, lightning, and occasional tornadoes. During the whole period that the sun is in the southern hemisphere, or from about the 22d or end of September till the 22d or the end of March, the sky is unclouded, the atmosphere clear, and the weather is dry, with occasional south and east winds, which eventually veer round to the south-west and west. About the end of December, the singular dry parching winds usually blowing from the east or north-east, denominated harmattans, begin to prevail, and continue from six to ten weeks. The description of these desiccating aerial currents is rather less complete than that of Mr Norris, given in the interesting work of Dr Winterbottom. It is well known that these winds convey through the air, and even deposit on trees and furniture, a fine impalpable sand, which Mr Boyle states they derive from passing over the Boullom shore on the north side of the Mitomba or Sierra Leone river. But if their ordinary direction is, as he allows, from the east, or, as is stated by Norris, from the north-east, it seems more rational to believe that they derive it from blowing over the great desert, which, though far in the interior, lies to the north east of this part of the coast. When speaking of this wind a little farther south at the Grain, Ivory, and Quaqua coasts, Mr Boyle admits that it blows over the Tarsha deserts.

The desiccating effects of this wind are singularly displayed in every object containing the smallest particle of humidity. Every article of wood dries, shrinks, and is rent into fissures; glass cracks; ink is speedily evaporated; pens become extremely brittle; and writing-paper becomes shrivelled and easily torn. Its effects on the human frame are, with the exception of newly arrived Europeans, to whom the harmattans are said not to be unpleasant, very uniform. To seasoned Europeans, and to natives, they are disagreeable in the extreme, irritating the eyes, ears, nostrils, and lips, which become parched, chopped, and shrivelled under its influence, causing extreme dryness of the skin, with more or less suppression of the secretions, and inducing catarrhal coughs, with a tendency to pneumonic, bronchitic, or pleuritic inflammation, and even, it is said, a species of irregular intermittent. During the prevalence of the harmattans the sky is clear and the air dry inland; but on the coast, where they encounter the alternations of the sea and land breeze, the atmosphere is dark and misty in the morning, and may continue in that state during the day. These winds continue occasionally to blow in this part of Africa till the end of February or the beginning of March. But they seldom blow more than three or four days at once; and indeed if they did, the vegetable world would be withered and killed outright. During the whole of this space the average maximum of the thermometer is about 86½, and its minimum about 80°, while the barometer remains nearly steadily at 29°.91 or 30°. With such atmospheric temperature it may be imagined that the vegetable world is in vigorous growth.

In February the weather becomes again variable and unsettled. The winds blow less steadily and regularly, occasionally dying away or veering round from the north east and east to the south and south west; the sky is obscured by clouds and the air with rising mists; the barometer sinks, and the electrometer becomes extremely variable, the pith-balls, which had previously been mutually near, diverging considerably. At length, towards the close of the month or the beginning of March, when the sky is more generally clouded, the depressed state of the barometer corresponds with an oppressive feeling in the atmosphere, and the total subsidence of the winds, or at most languid and variable breezes from the south-west and west, or south-south-west, while the humidity of the air is indicated by iron and other oxydable metals rusting rapidly, leather becoming mouldy, the liquefaction of salt, sugar, and other substances which had been previously dry and hard under the desiccating power of the harmattan. These changes in the weather indicate that the sun is approaching the equator on his passage from the tropic of Capricorn; and in three weeks, or some days more, the vivid flashes of lightning from the dense black clouds, with the thunder and rainy torrents by which they are accompanied, indicate the transition of that luminary to the northern equinoctial region. When, with these indications of disturbed equilibrium in the electricity of the atmosphere, are combined impetuous gusts of wind, it constitutes what is denominated in the language of the Portuguese voyagers the *tornado*,—a meteorological phenomenon of most outrageous and destructive character, and resembling, at least in the impetuosity and irregularity of its blasts of wind, the hurricane of the East and West Indies. The description of this elemental tumult given by Dr Winterbottom in 1802 is so natural and accurate, that it may be doubted whether Mr Boyle has improved it in the following sketch:—

"Its approach is first discernible by the appearance of a small, clear, silvery speck, at a high altitude in the heavenly expanse, which increases and descends towards the horizon with a gradual and slow but visible motion. In its descent it becomes circumscribed by a dark ring, which extends itself on every side, and, as soon as the silvery cloud approaches the horizon, veils it in impenetrable gloom. At that moment the elements seem to have ceased their operations, and the very functions of nature to be paralyzed; the atmosphere appears to be deprived of the spirit of vitality, and a sensation of approaching suffocation pervades and oppresses the physical system. The mind is wrapt in awe and suspense; but the latter is speedily relieved by the dark horizon being suddenly illumined by one broad base of electric fluid; peals of distant thunder then break upon the ear, and rapidly approach and increase in frequency and violence, till the shocks become appalling; when the thunder is at its loudest, a tremendous gust of wind rushes with incredible and often irresistible vehemence from the darkened part of the horizon, not rarely in its course carrying away roofs of houses and chimney tops, blowing down or uprooting trees, and laying the stiffest and largest ships on their beam-ends, or sinking them, whether under weigh or at anchor; and to that succeeds a furious deluge of rain, which falls in one vast sheet rather than in drops, and concludes the terrible convulsion."

The lightning accompanying this tumult of the elements is extremely vivid, seldom in the shape of what is termed sheet-lightning, and being readily attracted by lofty trees, ships-masts, and other elevated and pointed objects, rarely fails to commit irreparable havoc. The loud and heavy thunder-peals are represented to shake not only the buildings of Freetown, but the foundations on which they stand; and the reverberated sounds from the surrounding mountains augment incredibly the impressive awe of the scene. The whole of the phenomena of the tornado, in short, indicate a state of the atmosphere in which the electrical equilibrium is subverted, and an attempt to restore this equilibrium is made. The dead tranquillity of the atmosphere before its occurrence, and the closeness, heat, and oppressive sensation, while, in point of fact, it is barometrically lighter, and not proportionally thermometrically warmer, with which the storm is preceded, demonstrate great derangement in the electrical tension of the atmosphere; while the vivid flashes of lightning, the sudden and impetuous gusts of wind, and the excessive deluges of rain in which it terminates, may be regarded as efforts to restore the balance of this tension, and distribute electricity equally and uniformly. We regret that Mr Boyle has not on this point made some observations by means of a good electrometer; for it is chiefly in the torrid zone that these observations can be expected to lead to results illustrative of the meteorological changes of these regions. Observations of this description would be so much more interesting, that the tornado has been supposed to have considerable influence on the salubrity of the atmosphere. Some observers have imagined that the tornado brings with it something pestiferous,—an opinion maintained by Lind, favoured to some extent by the ingenious Dr Schotte, but entirely rejected by Dr Winterbottom, and even the opposite maintained by Mr Boyle, who ascribes to its influence the removal of noxious exhalations and deleterious *miasmata*. It must be observed, however, that the great and sudden cooling which it causes in the atmosphere cannot fail to exercise considerable influence on the human frame, and in all probability may at that particular period be productive of disease on those with susceptible systems. According to Dr Schotte, tornadoes make the mercury of the thermometer fall instantaneously 7 or 8 degrees. It is not unusual, according to Dr Winterbottom, for the thermometer to suffer a depression of 8° or 10° within two or three minutes after the storm has come on; and Mr Boyle states, that the approach of these atmospheric commotions is indicated by a fall so rapid, that in fifteen minutes the thermometer may decline from 86 to 74 = to 12°, or even to 69 = 17°. A depression so great and so sudden is very likely to excite fever, or some disorder of the gastro-enteric mucous system in those disposed. This, however, applies to the immediate presence of the tornado, and its concurrent effects. Its consequences are of a different nature; and it appears to us, if the tornado be in any way connected with the state of health, it is more reasonable to suppose, that the calm windless weather by which it is preceded is the unhealthy period, and that its occurrence has a tendency to render the air more salubrious. It is certain that the atmosphere, though warmer after the tornado, becomes clearer, and much less sultry and oppressive.

The rains commence within the tropics in March or April, are thoroughly established in May, and continue with more or less regularity and violence till the end of August or the beginning of September, or the month of October, according to the situation of the country north of the equator. Thus at the places near the equator, for instance along the leeward coast, comprehending the Grain coast, the Ivory coast, and the Quaqua coast, the rainy season commences about a fortnight or three weeks earlier than at Sierra Leone, (the end of May according to Winterbottom,) which is 3 degrees further north, and about a month or five weeks earlier than at Senegal, which is situate 10° or 700 miles farther north. As a general rule, it may be said, that the rainy season of any given place within the tropics commences about the period when the sun approaches the zenith of that place. It is further interesting to remark, that after the sun has passed the zenith of any place within the tropics, a temporary cessation of the rainy season almost invariably occurs at that place; and hence there may be observed in all tropical countries two rainy seasons, a former and a latter, separated with more or less accuracy by an interval of fair weather.

Nor do these equinoctial rains continue incessantly. Twelve hours of heavy rain are generally followed by twenty-four or thirty hours of clear fair weather; but during this period the evaporation has supplied the atmosphere with such a store of vesicular vapour, that the sky is in twenty or thirty hours more enveloped in a thick veil of dense black accumulated clouds, from which in a short period, with the discharge of vivid flashes of lightning, the rain is poured down in irresistible torrents and unbroken sheets of water. This excessive violence of the tropical African rains, however, does not take place till the sun in his return along the ecliptic, from the tropic of Cancer, attains the second time the zenith of the given place. At Sierra Leone, Mr Boyle observes, they vary in frequency and power till the latter end of June; in July and August, when they assume their greatest strength, twenty-four hours of uninterrupted fair weather are rarely experienced; yet even at this period the rains seldom continue longer than forty-eight hours without intermission. On the Gold coast, again, they commence with showers and partial tornadoes in March and April, in May they are established, and continuing through June, terminate early in July, at which period it may be remarked, the sun has passed to the tropic of Cancer, fully 16 degrees to the north of the latitude of the Gold coast; and is already returning towards the equator. In Senegal, according to Dr Schotte, the rainy season does not commence till the middle of July. The latitude of this place is about 16° N., and the sun must attain the zenith of Senegal about the 18th or 20th of May, and in the southward return about the 18th of July. It is evident, therefore, that this is the latter or second rainy period only, and that the first passes over in some seasons so slightly as not to be perceptible.

The quantity of rain which falls from the clouds in these latitudes may be imagined to be very great. According to Dr Lind, the quantity of rain which fell during one rainy season, consisting of four months, at Senegal, amounted to 115 inches perpendicular depth. Acçording to the observations of Dr Winterbottom, there fell at Sierra Leone in 1793, 86.28 inches, and in 1794 something more than 82 inches. The present author states the quantity of rain which falls in a season at the Gambia N. L. 13° 30′, or 2½ degrees south of Senegal, to amount to between 90 and 115 inches; that at Sierra Leone from 100 to 120 inches; that on the Grain and Ivory coasts to from 95 to 110 inches; and that on the Gold coast to vary from 80 to 100 inches. From so great a quantity of rain, it may easily be inferred how extremely humid the atmosphere is during the rainy season; and indeed so great is this, that leather and other animal substances become covered with *byssus septica*, iron and brass rust rapidly, and animals slaughtered for the use of the table are immediately covered with *ova*, which are converted in a single evening into myriads of maggots. This extreme humidity, however, is observed on the coast only; for in the interior about fifty miles, implements of iron or steel are kept in complete preservation. During the rainy season the thermometer is on the Gold coast 70½° in the morning, 78° at half past two P. M., and 73° at eight P. M.; on the Quaqua coast, where it is

70° at eight A. M., 76° at two P. M., and 73° at eight P. M. though to the newly arrived European the air between the rainy intervals feels cool and pleasant, the natives and seasoned Europeans complain of its cold, and the latter have recourse to fires; and at Sierra Leone, where the average maximum during the rainy season is 82°, and the minimum 77½°, the same effects are observed on the sensations of the human race. These sensations, therefore, which are not occasioned by corresponding thermometrical depression, must be the result of humidity and evaporation, which is not only incessant but extreme.

The rains begin to be less constant and violent in September at Sierra Leone, though at the end of October the winds are variable, and the weather still unsettled. The greatest height of the thermometer at this time is about 83½°, the least 78½°, the medium 80½, and the barometer varies from 29° 30′ to 30° 15′. The clouds now clear away, the mists are less frequent, the sky more generally clear; and in November the weather in general becomes settled, and continues so till the end of January or the beginning of February. This period, therefore, constitutes the dry season, which may be said to extend from the end of September or beginning of October to the end of February or beginning of March. To the south of Sierra Leone, embracing the Grain, Ivory, and Quaqua coasts, the dry season commences somewhat later, and the weather is steady and dry only in December, January, February, and March. The average temperature of this period may be stated at 81° for morning, 86° for afternoon, (two P. M.) and 84° for the evening. On the Gold coast, the latitude of which is the same nearly as that of the Grain and Ivory coast, but from 5° to 7° farther east, the rains are followed in July by a dense opaque watery vapour, denominated the *smoke*, obscuring the sun in the day, and forming a drizzling precipitate at night, chilling the atmosphere and the sensations extremely. About the end of September the sun at length appears at intervals when the day fogs are less dense; but the night deposit is still heavy and copious; and it is only in the commencement of October that they begin to diminish, and the wind becomes fresh; and about the middle of the month they are dispersed under the steady influence of the sea and land breezes. From this date, with the exception of a few days of rain, the commencement of the dry season may be reckoned, and from October it continues till February or the beginning of March, with occasional showers, however, and thunder and lightning in the latter months, especially in the evening. At this period the temperature on ship-board is in the morning 83°, in the afternoon 86°, and in the evening 84°, and the night dews in calm nights are heavy and copious, but rarely chilling.

The series of weather now described depends on the geographical position of the western coast of equinoctial Africa; and it not only communicates to, but receives from the physical and local peculiarities of the coast a very marked influence.

The first circumstance of this nature which deserves attention, is the general lowness and flatness of the coast, with little interruption, from the mouth of the Senegal to the Bights of Benin and Biafra, or even as far as Cape Lopez. With the two exceptions of Cape Verd and Cape Palmas, the whole coast from Cape Blanco southward is singularly level and flat, and the greater part is either alluvial deposit or a bibulous sand. Cape Coast Castle, indeed, stands on an insignificant elevation of gneiss and mica-slate; but the ground in the immediate vicinity is low and alluvial.

The second circumstance is, that this coast is intersected by a series of rivers and streams, the basins of which being particularly flat and alluvial, form, under the rays of a tropical sun, a most favourable nursery for the most acute and fatal distempers with which the human frame can be assailed. Independent of a multitude of small and inconsiderable streams, we find in this tract the basins of rivers, which, though not of the first rank, like the Nile, the Ganges, or the Amazon, are nevertheless of sufficient importance to exercise a remarkable influence on the salubrity of the coast. The country north of the line representing the mountainous belt of Jibbel Kong, presents four of these fluvial basins, the Senegal, the Gambia, the Cacheo, a few leagues south east of Cape Roxo, and the Rio Grande; besides several secondary streams as the Kasamansa, the Nunez, the Pongos, the Tanneah, Mahneah, and Morebiah, in one bay, the Forecarreah and Mellacorree, and lastly, the Scarcies. On the south of the line of Jibbel Kong, are the Mitomba or Sierra Leone river, the Mezurado, the Sherbro, the Gold river, the Ningo, the Volta, more than once supposed to be the outlet of the Niger, and, besides numerous streams of inferior note, the estuary of Cross River, Old Calabar River, and Del Rey in the Bight of Biafra, in all probability the true outlets of that singular river.

To enter into a minute description of the physical peculiarities of this level and well-watered coast, is neither within the limits of the present article practicable, nor is it necessary, since its character is so uniform, that the description of a single *embouchure* is, with very inconsiderable exceptions, applicable to the whole. A coast, invariably low and level, with an alluvial soil, either of loose porous sand, or dark mud-like mould, prolific to an extreme of vegetables and the very lowest orders of the animal world, may be said to extend, with little interruption, from the mouth of the Senegal on the north, to Cape Lopez, or beyond it, on the south. A just idea of the flatness of the coast may be formed from the fact, that the Casamanza and Rio Grande communicate along a space of 220 miles by a series of intermediate streams, which divaricate and enclose a chain of low insular deltas. Even the banks of the several rivers, for a long space up the basins, partake of the same character; and they are either extensive flat marshy levels, covered with rank grass or rice-fields, or rich black mud overgrown with mangroves, and exhaling, during the heat of the wet seasons, an oppressive and fetid emanation. Between the Rio Grande and the Rio Pongos, the country is elevated, and the rocky beds approach the sea. The peninsula of Sierra Leone, which terminates a mountainous ridge, said to ascend to the height of 5700 or 6000 feet, and which is perhaps to be regarded as the western extremity of Jibbel Kong, is about the sole spot at which mountain rocks appear. They are said to consist of granite, indurated claystone, magnetic iron ore, some quartz and sandstone, and, though capable of little cultivation, to be covered by lofty trees. South and east of Sierra Leone the only elevated points on the coast are Cape Monte, Cape Mezurada, and the space between Gold River and Cape Apollonia, which, however, merely rises into gently undulating hills.

The character of the coast is not less clearly illustrated by that of the islands scattered at various distances from it but chiefly opposite the embouchures of the rivers. Every one of these islands is, without exception, of alluvial formation, low, level, and generally void of rocky or elevated points. Such is the character of the Bissago islands between the mouths of the Cacheo and Rio Grande, as Formosa, Bulam, &c. those at the mouth of the Sherbro, and the three in the Bight of Benin, Fernando Po, Princes Island, and St Thomas Island. The whole of these are in general low, flat, and alluvial, and partake of the general physical characters of the coast. The six islands denominated de Los Idolos, off Tumbo Point, consist partly of the rocky structure continued from the continent, partly of alluvial matter brought down by the rivers. The Banana Islands are said to be volcanic in origin.

The circumstances now mentioned are important to be known in reference to the influence of this coast on the human frame. The whole coast without exception, but especially at the influx of the rivers, is naturally productive of remittent fever in a very powerful degree, of a fever which Mr Boyle distinguishes as irregular bilious, of ague, hepatic inflammation, and dysentery.

The first disease Mr Boyle distinguishes into climatic bilious remittent, and endemic or local bilious remittent, understanding

by the former, remittent fever as it occurs among the crew
ships of war cruizing on the coast, and which he imagines
exposed to climatic and meteorological, but not to local c
es of disease, and by the latter remittent fever as it occ
among merchant seamen after they have commenced their lab
on the rivers, or among European settlers generally. How
similar in symptoms and progress these two diseases may
and have generally been held to be, Mr Boyle contends t
are essentially different, and require totally different mode
treatment. If we demand the reason of these distinctions,
find it nowhere unless in the fact already stated, that the
mer variety occurs among men recently brought into the A
can equinoctial latitudes, but who have not yet touched
coast, and on whom, therefore, the local peculiarities of the
face cannot have had any occasion to operate. Without
tending to deny absolutely and unconditionally the validit
this distinction, we must say that it appears too feeble and
significant to afford grounds for considering the ship fever,
may be named, of the African coast as different from the l
fever, unless in degree. Does the simple climatic fever not
cur among the residents newly arrived from Europe as wel
among the seamen who have never landed or sailed up th
vers? and conversely, does a disease, in all respects simila
the land endemic, not occur occasionally among crews of ve
before they have had opportunities of visiting the towns on
coast? It is even manifest from the cases adduced by Mr B
to confirm the truth of his distinction, that, if not positi
unreal and imaginary, it is at least very refined, and almost
practicable. If Mr Boyle adds to the distinction above-n
tioned that of the climatic fever being less insidious and less
tal, as he appears at p. 85, 86, and 114 to do, we must
be permitted to doubt the validity of the distinction fur
than in mere degree. It is further remarkable, that on bo
the same vessel in which the climatic cases occurred, the
rene, not only did cases of remittent occur in the persons of
regular and dissipated characters, but a case of severe, rapid,
fatal fever, in all respects similar to yellow fever, occurre
1823 in the person of Mr Boyle's assistant, and this he ad
to have been a sporadic case of the disease, which soon af
wards committed such havoc at Sierra Leone, on board of
Bann, and finally at the Island of Ascension. Now, as
Boyle himself admits that the bilious remittent differs f
pure yellow fever only in being endemic, while the latter is
demic, how can it be inferred that within the tropics, on s
board, when the causes capable of producing the most se
remittent or even yellow fever exist, the endemic remit
should not occur.

The distinction for which Mr Boyle thus contends, is chiefly for the purpose of showing that the simple climatic form requires a different treatment from that of the local or shore endemic. The blood drawn in the former, he remarks, is natural, and does not exhibit the "buffy appearance so characteristic of the existence of inflammation in the bilious remittent fevers of other tropical countries;" and, consequently, he infers, blood-letting even on ship-board, and in cases otherwise favourable, "must be practised with a cautious and sparing hand." With this limitation, however, he allows that blood-letting ought to be the first measure; the second the administration of calomel in large doses, with the twofold purpose of moving the bowels and affecting the mouth slightly; and with this view he recommends afterwards "two grains of calomel, with one-eighth of a grain of opium, to be given every two hours until slight salivation and a remission of the febrile symptoms take place; when one grain of blue-pill, and two of quinine, in the form of pill, may be substituted, and repeated at the same interval as the calomel."

> "If the first abstraction of blood from the arm does not sufficiently subdue the febrile excitement, the local abstraction of blood, by means of cupping or leeches, from the seat of pain, may be adopted as the most judicious practice; and if, after the use of that remedy, pain or mental aberration continue or set in, the application of a blister to the neighbourhood of the affected part may with propriety be had recourse to. These measures are to be repeated according to the intensity of the disorder."

In these therapeutic measures we think an unbiassed mind will recognize nothing more than adaptation of remedies, and especially the grand one of blood-letting, to the degree of the disease; and we still think it difficult, if not impossible, to derive from this modification of treatment sufficient evidence to prove that the fever is different in kind or even in species.

This disease, however, we must not forget to remark, is always more effectually opposed by preventive than by curative measures; and we have pleasure in learning, that in the ships of war at least which are stationed on the western African coast, every measure is enforced which is likely to preserve the crew in health. Drunkenness, the most fertile source of sickliness in tropical countries, is punished as a crime; clothing, especially by what are denominated blanket dresses, is served out and always used for the night watch, the most sickly period of the diurnal revolution; ventilation and cleanliness are most strictly and unremittingly enforced; and the duties of wooding and watering are executed by a number of natives (Kroomen) employed for the period according to the rating of the vessel. The latter resource was originally suggested by Dr Lind, from observing the numerous attacks of fever, generally fatal, that invariably followed every European watering party. It is an indisputable proof of the accuracy of his observation, that, according as these regulations are loosely or carefully observed, a ship's crew is sickly or healthy.

Within the tropics the wet or rainy season is the sickly, while the dry season is comparatively healthy. It is further established, that the commencement and the termination of the rainy season are the periods most abundantly productive of fever. The moment the first rains descend on the ground previously parched and burnt by the uninterrupted sun of four months, with occasional harmattans, the vegetable world, previously withered and apparently dead, starts into vigorous and luxuriant growth. At the same time fever cases at Freetown in Sierra Leone become numerous and frequent, not only from the localities of that town itself, but from the winds, which are then north and east, or north-east, wafting from the Boullom shore on the north side of the Mitomba, a copious and inexhaustible supply of air loaded with vegetable and animal miasmata. It is impossible, indeed, to conceive any combination of circumstances so favourable to the production of malignant remittents as those now specified; and whatever be done to improve the vicinity of Freetown, so long as the flat alluvial and swampy shore of Boullom continues to load the north and north-east winds with its poisonous products at the beginning of the rains, so long will Sierra Leone never cease to be the nursery of the most fatal remittents. When the rains, indeed, are fully established, and have thoroughly flooded the level banks of the Mitomba, fever cases are rather less numerous. But no sooner do they become less violent and the sky becomes clear towards the termination of the rainy season, than, with the augmented evaporation, they again increase in number and fatality. At this period, however, the vicinity of Freetown is chargeable with its own insalubrity only. The winds being rarely from the north or north-east, do not now, as at the commencement, blow over the Boullom shore impregnated with all its deleterious vapours.

It is quite superfluous to transfer to our pages the description of this fever given by Mr Boyle. It is sufficient to say, that it bears an accurate general resemblance to the remittent of tropical countries, now so repeatedly and so minutely described by many authors, in the affection of the vascular system of the brain and gastro-enteric apparatus, in the occurrence of remission after exacerbation, and yellowness of surface and dark-coloured discharges, especially from the bowels. The fatality of this fever is very great. According to Dr Nicol about one in 12, or very nearly 9 per cent. of the better class of society, died in 1829 in Sierra Leone; and among the poorer classes of Europeans, it was considerably higher.

In the treatment of the local remittent of the African equinoctial coast, Mr Boyle is not less averse to blood-letting than in that of the climatic variety. If in the latter, in short, it must be used sparingly and cautiously, in that resulting from the operation of local causes, he represents blood-letting to be, on the ground of actual experience, generally inadmissible, as directly pernicious. As Mr Boyle scarcely attempts to generalize his reasonings, but confines himself to a statement of the mode in which his mind, originally inclined to the treatment by venesection, was converted by the effects of this treatment to renounce its use, we shall give one or two of the facts which he adduces.

> "On my arriving in the colony of Sierra Leone in June 1827, I was still buoyed up with the hope of success in my intended adoption of a more cautious and judicious use of the lancet, than what seems called for, in the treatment of fevers prevalent in tropical countries. I soon had ample opportunities of putting my view to the test, and the first remarkable instance that occurred is worthy of particular mention.
>
> "Among a great many cases of fever under my care, were seven of the crew of the *Thomas Gelston*, a merchant ship, which had been about eight weeks on the coast, and loading with timber up the Sierra Leone river. The cases were brought on shore, and lodged in the same house. The Captain having requested my attendance accompanied me, and in his presence I blooded six, in whom the febrile symptoms were most marked. In the end the whole of the seven died; but the most delicate, the one not blooded, outlived the strongest of the others, for the space of about twenty-four hours."

This fact is not particularly conclusive against the use of blood-letting. Without adverting to the difficulty of determining from mere external appearance, the comparative strength of different individuals, since those most delicate in appearance possess often more real energy and endurance, or what is called bottom, than others of robust and vigorous aspect,—it might be that the period of the disease was too far gone for blood-letting to be of much use, or that too much reliance, we say this without any personal allusion to Mr Boyle, had been placed on blood-letting to the exclusion of other remedies. Mr Boyle, however, shall proceed in his own way.

> "In the latter end of 1830, the boats of his Majesty's brig Plumper were employed in crossing some of the rivers to the northward of Sierra Leone for slave vessels, of which there was information; and as the people engaged in this service were greatly exposed to Malaria, fever soon made its appearance among them. The brig put into Sierra Leone, and 35 of the crew were sent to the military hospital; of which 29 were dead, two in danger, and four in a state of extreme debility when I last had the opportunity of learning of

them through the naval medical officer who visited the hospital for information, and that in despite of the lancet both aboard and ashore. These were cases of local endemic, and the mortality, extended in my opinion by the use of the lancet, was incomparably greater, in point of numbers, than I experienced in my own practice in the epidemic of 1829."

Mr Boyle therefore has arrived at the conclusion, that, in the treatment of West African coast fever, blood-letting is highly injurious, and ought not to be practised. In his farther prosecution of the subject he attempts to explain this exception which the West African coast fever constitutes to those of tropical climates generally, and those of the West Indies in particular, by suggesting, that originally, when we first became acquainted with the West Indies and sundry parts of the East, these countries were in a state of nature, uncleared, uncultivated, and teeming with the worst forms of tropical disease as the African continent at present; and that their subsequent disforesture and eventual cultivation, with all the improvements resulting from the construction of quays and wharfs, the embankment of rivers, &c. has modified the type of disease, and by giving the fevers of these countries a more manifest and intense character than they originally possessed, has rendered blood-letting a more necessary, and consequently a more judicious practice. Accurate observers, he states, had in these former periods tried blood-letting as a remedy without success; and the lancet only became beneficial after the endemic disease, by a progressive change in the physical and salubrious qualities of the country, had undergone a change in its characteristic symptoms.

In this distinction we will not deny there is some plausible reason. The West African coast may at the present moment possess qualities which impart a peculiar character to its febrile maladies; and by changes in the surface, and especially by divesting it of its rank-growing vegetable products, these qualities may be diminished or altogether removed. But what will Mr Boyle say to the numerous cases cured, if we remember right, by old Lionel Wafer, by the most copious and indiscriminate blood-letting. Warren did not object to blood-letting, nor does Ligon tell us that it was injurious. On the whole, we are inclined to think, that blood-letting is injurious only when it is employed at too late a period of the disease, and therefore especially so in very rapid fevers; and that it appears to be useless, when it is not aided by other auxiliaries.

The remedy on which Mr Boyle is disposed to place most reliance for the cure of endemic fever is mercury; and, like many of our tropical friends, who think it impossible to do any thing without this mineral, he regards the patient as out of danger the moment salivation takes place; and adds, that not a single case of genuine Sierra Leone fever recovered, where mercury was administered, in which salivation did not take place either previous to, or along with the favourable change. Now it is matter of observation, that in severe cases of fever, so long as the febrile state continues, it is impossible for mercury to affect the constitution; and there is therefore every reason to believe, that in the cases in which salivation takes place, the febrile process was giving way either spontaneously, or under some favourable combination of circumstances. Mr Boyle, however, does not deny that cases recover without the use of mercury; but such occurrences, he maintains, are extremely rare; and the question, whether this local endemic fever can be cured by European practitioners without the use of mercury, and whether there is any other practice that can with propriety be adopted in preference to mercury, he rather evades than answers. Common bilious attacks, he argues, are frequently confounded with endemic fever; and as it is rarely possible at the outset of the disease to distinguish between the two, several of these cases which have been treated without mercury may have been imagined to be instances of endemic fever cured in this manner, or where mercury has been administered without its proceeding to affect the mouth.

Mr Boyle, nevertheless, disapproves of early salivation, that is, on the second or third day, because it generally proves unfavourable, that is, we presume, the patient dies. In explaining this unexpected result he is singularly undecided, and evidently perplexed. First, he remarks there are two reasons for this; the first that the medical attendant, observing that he has succeeded in his object, will generally remit, or altogether withdraw the medicine; and the second, that the patient in all probability, having been previously informed that all is well if salivation appear, and loathing the disagreeable feeling, refuses to take any thing supposed to contain mercury, even should his physician deem its continuance necessary after its operation was evident. "Experience, however," he immediately remarks, "leads to the conviction, that there must be another and more deeply seated cause;" but what this deeply seated cause of death in cases of early salivation in fever is, he leaves to the reader's ingenuity to discover.

The means which Mr Boyle uses to effect his object are first, a scruple of calomel in the case of an adult male, followed by a purgative draught; and, secondly, two grains of calomel every two hours, with leeches or blisters, or both applied to the head. If the calomel pills be rejected by vomiting, he repeats the scruple dose with a few grains of calcined magnesia; and if the stomach is still refractory, leeches to the epigastric region, followed by a large blister, are recommended to subdue its violenc while the occasional administration of twenty or thirty grains carbonate of soda is supposed to tranquillize it. If these r sources fail, mercurial friction is the alternative.

Mr Boyle reprobates in the strongest terms all attempts removing patients, however unfavourable the locality in whi they may be, and however salubrious that to which they a proceeding, and all attempts to sit or to undertake business. Th are always dangerous, and often fatal.

Ague or intermittent fever is the legitimate product of the s of Western Africa, especially within the torrid zone; but in i regular form it affects chiefly natives of the country. Both n tives and Europeans, however, are very generally affected an irregular, or, as Mr Boyle terms it, an illegitimate ague, which the prominent symptoms are an icy sensation of cold the back, fleeting to and fro, muddy glazed eye, pale count nance, swelled belly, and irregular bowels, with general relaxati of the system, and peculiar mental irritability. This variety ague is said to be met with only on the West African coast, a to have been hitherto unnoticed by authors. But it bears a clo resemblance to the chill ague *(tertiana algida,)* of Torti, a like that it appears to derive its peculiarities from its close co nection with bad remittents. It is another mark of resemblanc that the spleen is in general sooner or later enlarged, from t blood being so much accumulated in its spongy yielding textu From the account of Mr Tidlie, staff-surgeon at Cape Co Castle, and which is not contradicted or modified by Mr Boy it results that this variety of ague is a sequel of the remitte of the country; and it arises, according to this gentleman's view from the habitual accumulation of blood in the vessels of t abdominal organs, almost uniformly consequent on remitte fever. Hepatic derangement especially is stated to be a ve frequent cause of this ague.

In the treatment of this disease bark and quinine are said be of little or no use. Purgatives, on the contrary, and tho especially which operate on the biliary secretion, are said to ford certain, though seldom permanent relief. Small doses quinine after calomel purgatives, three-grain doses of quini with blue pill, or arsenical solution if quinine disagrees and au ments the febrile symptoms, or frictions with camphorated m curial ointment, regulated diet, and finally change of air a scene, are recommended. In all instances of incurable or unm nageable disease, medicines are numerous, but remedies fe and of the truth of this observation the icy ague of Weste Africa is a remarkable example. It is manifestly the subseque effect of a previous state of disease, and this it should be t great object of the physician first to control. To us it appears that, next to change of climate, repeated small bleedings in the right hypochondriac and epigastric regions, or the irritation of frequent blisters, a seton or an issue, would be, with purgatives, most effectual in removing the disorder.

We now come to the grand *quæstio vexata* of the disease, which has been with equal originality and judgment denominated the *Bulam* fever. On a former occasion we attempted to show with how much regard to historical accuracy this disease was considered as a new one, and what profound acquaintance with the medical topography of Africa was necessary to trace the rise and progress of this unheard-of pestilence. The facts and arguments which we then adduced regarding the appearance of this fever in an island which was then for the first time visited by Europeans, it is unnecessary at present to repeat; and were it not for a most conscientious desire to remind those for whom our regard is equally sincere and lasting, of sundry circumstances which it is not good for them to overlook, we should not take the trouble to recur to a subject which, however important, must become tedious by frequent repetition.

Notwithstanding the general regularity of the seasons within the tropics, and the general accuracy with which the rains and sickliness and dry weather and health are united, there are certain years in which, from a peculiar concurrence of circumstances, the wet season is unusually sickly. It is remarked that even in aguish and miasmatic districts in the temperate zones, every year is not equally productive of ague, and that every now and then agues become so severe and so general, and remittents are so general and so fatal, as to constitute a temporary epidemic pestilence. Precisely the same is the situation of the western coast of equinoctial Africa. Though no coast perhaps in the habitable globe is more uniformly productive of endemic fever annually, yet in certain years, from a particular combination of circumstances, this native and regular sickliness acquires an epidemic and singularly fatal character. Without pretending to specify all the circumstances necessary to so calamitous an occurrence, we may say that two are particularly conspicuous; the one an unusual state of the weather at the approach and during the continuance of the rainy reason, and the other a greater than usual proportion of newly imported European population. Whenever there is a calm windless state of the atmosphere, or fogs, with considerable depression of the barometer immediately before the rainy season, it is likely to be more than usually unhealthy. In these regions of the torrid zone, not more than 10 or 15 degrees from the equator, there is at all times, even when the sun is in the southern hemisphere, sufficient heat to act on many parts of the swampy, muddy, coast soil; and when the sun approaches the equator at the close of the dry season, unless the wonted winds accompany his course, and at once promote evaporation in a less injurious form than by mere solar heat, and disperse the morbific exhalations, disease of a severe and comprehensive form is most liable to follow. Thus so early as 1755, a most extensive mortality, it is mentioned by Lind, was occasioned on the Guinea coast under circumstances of this description; and so severe was the epidemic that the black native population suffered in a degree not much inferior to that of the white. When the rains begin early, and inundate the low and swampy banks of the rivers on the west coast of Africa, disease seems in like manner to assume the epidemic form and the malignant character, with insidious remissions, yellowness of the surface, and vomiting and purging of black coffee-ground or tar-like matter. In 1766, when the rainy season commenced early, and the heavy rains quickly inundated the whole island of Senegambia, fever quickly supervened, became epidemic, and swept off immense numbers of the colonial, and even the coloured population. In 1775, the frequent heavy rains were in like manner, on the report of the accurate Dr Schotte, followed by a bilious fever, which attacked many, and which in some induced all the symptoms of the disease vulgarly denominated yellow fever. In 1778, when the rains commenced early, and were frequent and heavy, and continued long, inundating part of the island, fever appeared in the beginning of August, and continued till the middle of September, cutting off the greater part of the European population, and a great number of the native mulattoes and blacks. So general was this disease, that Dr Schotte, the author to whom we are indebted for the description of it, regarded it as contagious,*—a mistake by no means to be wondered at, when it is remembered that not fifteen years before Cleghorn had ascribed contagion to the agues of Minorca and Lautter to those of Luxembourg, in imitation of Hoffman and Meibomius.

But though these malignant epidemics arose from the species of weather operating on the surface, they require subjects on which to operate. Though in sickly seasons they spare neither black nor fair race, there is not a doubt that for the latter they manifest a peculiar predilection. The European in preference to the coloured population; the newly arrived European in preference to those who have been long inured to the climate; and finally, the northern fair European race, as the British, Germans, and Swedes, in preference to the darker coloured natives of the south, the French, Spaniards, and Italians,—form the eligible subjects for genuine tropical fever.

---

* A Treatise on the *Synochus Atrabiliosa*, a contagious fever which raged at Senegal in the year 1778, &c. by J. P. Schotte, M. D. London, 1782.

It is by no means wonderful, then, that the colonists of Bulam under Captain Beaver in 1792 suffered so severely from fever on that insalubrious island. Fresh from Europe with their European unseasoned constitutions, they arrived most injudiciously in the very time (June) when they encountered not only the early rains when the sun comes first to the zenith on his northward passage, but the irresistible torrents poured down when he returns to the southern half of the torrid zone. Any other result must have been under the circumstances so impossible, as to imply an exception to the general laws by which the equinoctial seasons are regulated.

Whenever the same circumstances concur in this unhealthy coast, the same result, with very inconsiderable exceptions, is observed to take place. Independent of the regular annual mortality at Sierra Leone and other settlements, there are every now and then a sickness and mortality extraordinary, either in consequence of the early appearance and unwonted severity of the rains, or the importation of a number of new and unseasoned Europeans, or from both causes combined. The year 1823 was distinguished in this way particularly. The rains commenced so early as March, and continued with singular severity, alternating with a burning sun, now crossing the equator, and attended by thunder and lightning, with the thermometer varying from 78° to 80°, and never below 77°, and a tendency to calms. Fever appeared so early, that, at the time usually distinguished as healthy, many persons were actually ill. " The victims were, in general," says Dr W. Barry, the deputy-inspector, " those newly arrived from Europe, the robust, the plethoric, and those that indicated unbroken constitutions. The mortality, however, was not confined to those classes ; for many who were considered perfectly assimilated to the climate have fallen sacrifices to the destructive pestilence." It is remarkable, however, that the military sick returns presented few traces of the ravages of this disease ; and the whole of the black population are said to have escaped its baneful influence.

But if the influence of atmospheric distemperature on the local peculiarities of Sierra Leone generated fever on the coast, it seemed not less effectual in inducing sickness among the crews of vessels moored or sailing in the neighbourhood in these latitudes. Besides one or two cases said to have occurred in the Caroline timber-ship, it was on this coast that the Bann was stationed from the 16th January to the 27th March, previous to the appearance of that disease which broke out, with all the symptoms of yellow fever among her crew, during her voyage to the Island of Ascension. The facts of this visitation, and of its extraordinary appearance among the garrison of Ascension, were on a former occasion laid before our readers; and we merely mention the circumstance here, to show the facility with which a healthy ship's company may become sickly on this deleterious station. It is impossible to doubt that the disease of the crew of the Bann resulted from the climatic peculiarities of the West African coast during a season of similar insalubrity. On the mode in which the disease afterwards appeared among the garrison at Ascension, whether by propagation from the Bann, or by the influence of the same general atmospheric causes on the porous surface of the volcanic island of Ascension, we feel that we have not means to determine with certainty; and the question must be illustrated by the result of similar facts in similar circumstances. We shall see that Mr Boyle infers, that a disease like the tropical epidemic may, under peculiar circumstances, acquire infectious properties.

It was not till 1829 that another epidemic visitation appeared in Sierra Leone and its vicinity. In this season the rains commenced after fourteen days of cloudy weather, on the 24th March, exactly when the sun was passing to the northern half of the torrid zone; and about fourteen days after tornadoes were frequent. The thermometer at this time was never below 82°, and at four in the afternoon was generally 83° or 84°. The state of the barometer and hygrometer is not mentioned; the last apparently had been early broken. The rains proceeded with more or less regularity through the rest of April and the whole of May and June; and by this time about twenty-eight cases of severe fever, most of them fatal, had taken place in Freetown, chiefly among the Europeans. The first fatal case occurred so early as the 21st April; the second on the 4th May; and the third on the 9th; and after this period the disease spread rapidly both on shore and on ship-board, and continued its ravages till the height of the secondary rains in the middle of August inundated the country, and probably prevented the exhalations from being extricated from its surface. The entire number of cases is nowhere fully given; but of forty-two cases which occurred among the European population (only 120) between the 21st of April and the 27th, or end of July, only thirteen recoveries took place, and twenty-nine died. The symptoms of all these cases were very similar. At first great affection of the vascular system of the head and stomach, with red dry tongue throughout; then insidious remissions in the vascular action, without improvement of the skin or tongue; then yellowness spreading from the skin of the face and neck over the body, and vomiting and alvine discharge of dark coffee-coloured matter. On inspection, the mucous membrane of the stomach and small intestines was found reddened in irregular patches. The necroscopic reports, however, are not very accurate or complete; and the brain was not inspected,—a signal and important omission in our estimation, whatever the author may say as to the symptoms not leading him to expect morbid changes in that organ.

The occurrence of this fever in Freetown was first sought for in sundry imaginary local nuisances, and then imputed to importation by his Majesty's ship Eden, which had arrived about the 10th of May at Sierra Leone from Fernando Po, and in which there had been much sickness and many deaths. In this vessel, though by no means cleanly however, it was ascertained that the only cases of disease which had occurred for nine or ten weeks previous to her arrival at Sierra Leone were affections of the bowels; and it was on her arrival in the Mitomba that the fever cases took place. Mr Boyle, indeed, who was requested to inspect her and report, expresses his conviction that the seeds of the disease existed in her long before her arrival in the river; and it further appears that her seamen were in the habit of strolling about the streets of Freetown night and day in a state of inebriety, and freely exposed to the heavy rains then prevalent. The Eden sailed, but the disease continued, and even increased, not only on shore, but in vessels in the river, which had no communication with the Eden or with each other. The epidemic was then ascribed to one or all of three slavers, two of which, a Brazilian and a Netherlander, had been captured by the Eden, and a third, a Spaniard, by the Sybille, not far from Fernando Po. The first, the Mensageira, had on board 184 slaves, 127 having been landed at Fernando Po, and 42 having died since capture. At the period of inspection, 5th May, the slaves were very unhealthy; 19 were affected by a peculiar malignant ulcer, named on the coast the Fernando Po ulcer; many were labouring under intestinal disorders, *crawcraw*, an affection peculiar to the negro, and ophthalmia, which is common to slave-ships. In the second slaver, the Hirondelle schooner, there were only 73 slaves, several of whom were affected by ulcers, in consequence of wounds or scratches. In the third vessel, the Panchita, the number was 282, nine having died since capture, 20 being affected with intestinal disorders, and a few with *crawcraw*. So far as the evidence goes, in short, it does not appear that in the cargoes of these vessels there was a single case of fever at the time of their arrival at Sierra Leone.

Little doubt can be entertained that the true cause of the disease existed in the banks of the river itself. Two timber vessels went up the river in March to load, and came down, early in May, to Freetown anchorage, where both were exposed to north-east tornadoes from the Boullom shore; and immediately after this several of the crew of both vessels were attacked. In a Liverpool vessel, lying exposed to the same wind, the only three men on board sickened and died. A vessel direct from England quickly lost half her complement of men. Two other vessels, which had also arrived from England, in the Sierra Leone river, left Freetown harbour in good health, the one for the river Scarcies, the other for the Mellécorree. The moment they arrived in these places every man on board of each successively sickened, and all died except the captains, who made a narrow escape. This occurrence led to the presumption that the disease was not confined to Sierra Leone, and demonstrated the operation of a general cause. By means of a mission sent to Dalla Mahamodoo, an intelligent native prince, resident at Medina on the Boullom shore, nine miles above Freetown, an inquiry was instituted among the chiefs of the neighbouring tribes in the interior, to ascertain, if possible, whether any epidemic disorder had appeared among their communities; and the following results were obtained. A disease, commencing with a sensation of cold, followed by pains in the head, back, and chest, and region of the stomach, with sickness and vomiting of yellow and black matter, delirium and thirst, had appeared about Christmas 1828, first in Sangarrah, a country about thirty days' journey in the interior, (600 miles, *) north-east from Medina, low, marshy, and covered with jungle, and cut off, with many of the common people, a greater number of chiefs within a few months, than was ever remembered from a similar cause in an equal number of years. Bantoe, a district lying to the south-west of Sangarrah, is said to have suffered extremely. Of twelve men sent in March to hunt elephants, one only returned alive, the others died in the forests from the insalubrious state of the atmosphere. Between Sangarrah and Footah Jallo, two degrees west of the former, entire villages are said to have been depopulated. From Laheer, through the Mandingo country, in a south-west direction, to Fouricaria and Mellécorree on the coast, an unprecedented number of chiefs died, and the mortality among the people generally was immense. In the Foulah country, though sickness prevailed to a great extent, the diversity of hill and valley appears to have diminished the severity and mortality of the disease in a remarkable manner. In Yongroo, a village near Medina, four deaths occurred; but Medina itself remained healthy.

---

* This must be overrated, as the longitude of Sangarra is represented to be 6° west from Greenwich. The town of *Sankary* is situate at the source of the Niger, about 400 miles east; from this town the neighbouring district between the sources of the Niger, Senegal, Gambia, and Mesurado, appears to be denominated.

If any reliance can be placed on these native statements, and Mr Boyle regards them as perfectly credible, it appears that a severe and eminently fatal febrile disorder travelled from Sangarrah, in the interior, in a south-west direction, or from the north-east to the coast. Of course it does not result from this, that a stream of infectious principle had crept gradually from village to village, till it arrived at the coast, but simply that, as the north-east winds prevailed at this period, they had wafted the morbific exhalations as they rose from the surface, in the tract from north-east to south-west, affecting the inhabitants of the towns and villages as they passed. By messengers from Timbo or Teembo, the capital of the Foulahs of Sierra Leone, on a tributary of the Rio Grande, in the beginning of August 1829, it was ascertained that an epidemic prevailed there twelve months before, and had terminated only about four months ago. According to the statements, this disorder was attended with pain in the head, back, and loins, hot skin, dry black tongue, and in some with vomiting of dark-coloured fluid. By the inhabitants of Timbo it was believed to arise from an attempt made to clear a swamp in the neighbourhood of Timbuctoo. From this it was said to have spread to Jenni, on the north bank of the Niger, not far from Silla and Sansanding, two of Park's stations, and thence to Footah Tauro and Footah Jallo.

It was, however, unnecessary to attempt to trace the disease so far east as the neighbourhood of Timbuctoo. According to the most accurate accounts the longitude of this long sought native city is not above 2° east of Greenwich, and the latitude about 16° north, and the morbific emanations must have had to travel a distance of 580 miles before they reached Sangarrah. It may have been that a swamp was attempted to be drained, and that a fever prevailed along the banks of the Upper Niger; but assuredly, with causes so sufficient as this part of Africa presents, it was totally gratuitous to trace the origin of the Foulah epidemic, much less that of Sierra Leone, to this remote origin. The truth is, that *Sangarrah* or *Sankary*, as it is occasionally named, is situate in a country from which the Niger, the Senegal, the Gambia, and the Mesurado originate. The whole country is intersected by numerous streams; and though in the dry season, or at least towards that period, these may be separate rivulets with dry or oozy banks, in the wet season the country must be one uniform marsh, or a series of lakes with marshy banks. On the approach of the dry season again, when the waters begin to subside, the evaporating and drying process will readily generate miasmata, which, under favourable winds, may be wafted down to the coast along the river basins, while these basins themselves and the whole coast are not less productive of febrific exhalations than their sources.

Notwithstanding these considerations, the justice of which will be admitted by any one who has been accustomed to investigate the subject, and who has studied with a little attention the topographical peculiarities of this part of the African continent, Mr Boyle concludes, that the epidemic of 1829 originated in the interior, in consequence of peculiarities in the season, and was carried to Freetown by the north-east winds. The agency of the latter cause cannot be questioned, and probably it augmented the prevalence of the disease to the south-west. But when we consider the Sierra Leone coast, we are inclined to regard the disease of that district as proceeding not from the interior, but as arising along with that of the interior, from the same causes operating simultaneously or successively on a terrestrial surface of the same character. The justice of this view is further corroborated by the origin and progress of the disease in Freetown. From the useful plan of this place given by Mr Boyle, it appears that the cases occurred chiefly in houses situate close on the beach of the river, forming the upper or east side of St George's Bay, where they were particularly exposed to the north-east wind, and the exhalations brought by it either from the Freetown or the Boullom side.

Among other notions generated by the alarm of the epidemic, it was imagined that it was a contagious fever; and indeed the course pursued by the disease was not ill calculated to create such an opinion among those who are desirous to be spared the trouble of much observation. This, however, was speedily repelled by a declaration of the medical officers of the colony, founded apparently on the following circumstances; *first*, that it was of local origin, and not imported unless by the agency of the winds; *secondly*, that its chief cause was *malaria*, originating in irregularity of season and distemperature of the atmosphere; and *thirdly*, that its ravages were confined exclusively to those parts of Freetown which were most exposed to the north-east winds, and that the disease in no instance spread or affected those not exposed to its meteorological causes.

Subsequent events, nevertheless, induced Mr Boyle to believe that the Sierra Leone fever, which by the way corresponds in all respects with the yellow fever of the Antilles and equinoctial America, may acquire contagious properties. The Eden, the vessel already mentioned, put to sea to get rid of the sickliness on board, and eventually proceeded to Fernando Po. At Sierra Leone, and on her voyage to the latter place, she had lost her commander, surgeon, assistant-surgeon, and more than fifty men. Some time after their arrival, the Sybille, which had been cruizing in the Bights of Benin and Biafra, from December 1828 till the 21st of June 1829, also put into Fernando Po. All communication with the Eden and the shore was prohibited during the stay of the Sybille, apparently under the apprehension of receiving disease. This non-intercourse, however, does not seem to have been strictly observed; for it is admitted, that the purser, who afterwards died, and one or two of the superior officers of the Sybille, formed an exception, in other words, we presume, visited the island. On the 22d June also, the Sybille received from the Eden a sergeant of the Royal Marine Artillery and seven marines, who came from England in the Champion, a vessel which had also had a good deal of fatal fever since her arrival off the African coast; and on the 23d, the Sybille received from the establishment at Fernando Po a marine, brought also from the Champion. The same day one of the men brought from the Eden on the 22d, was attacked by fever, and sent ashore; and on the 2d of July, the man received on the 23d June was seized. From this period the disease spread rapidly among the crew of the Sybille, so that twenty cases of manifest yellow fever occurred in July, and forty-seven in August, making with the two in June altogether sixty-nine, of which twenty-two died. As quickly as possible the ship put to sea, and arrived at St Helena on the 12th September without a man on the sick list. She remained healthy till the 13th January 1830, when yellow fever again appeared off Cape Formosa. After communicating with her tender, the Black Joke, fever appeared in the latter vessel, and in February spread with such irresistible rapidity as to affect eighty-seven of the company, and cause twenty-six deaths, with all the usual symptoms of yellow fever. The disease reappeared in the Sybille at St Helena on the 22d March, and produced twenty-two cases and six deaths. From these facts Mr Boyle is disposed to think that the disease was communicated by the crew of the Eden to the crew of the Sybille, the Champion, and Hecla, and from the Sybille to the crew of the Black Joke.

It must, nevertheless, be remarked, that the only strong case is that of the communication of the Sybille to the Black Joke. That the crew of the Champion lately arrived from England, and coming into the very latitudes where fever prevails, should be attacked with that disease is by no means wonderful. She appears, by the letter of Colonel Nicolls, the Governor of Fernando Po, to Major Ricketts, Lieutenant-Governor of Sierra Leone, to have touched at the latter place; and mere exposure to the land atmosphere is amply sufficient to induce fever during a sickly season. That the disease should break out in the Sybille on her arrival at Fernando Po is equally natural; for not only is that island of itself peculiarly insalubrious, but its situation in the

Bights of Benin and Biafra, the most unhealthy region of central Africa, immediately under the equator, renders it if possible infinitely more so, and must make it a sort of African Vera Cruz. The circumstance of the long sea cruize also rendered the ship's company particularly susceptible to morbific exhalations when approaching the coast. When it is further added, that there is some indication that the vessel was not herself remarkably clean, on coming into the anchorage of Fernando Po on the 21st June, within reach of the land winds, is it matter of wonder that the crew became affected during a sickly season with the prevailing epidemic?

The whole matter, therefore, resolves itself into the case of the Sybille and the Black Joke; and it must be admitted, that, in its present state, the case looks very like one of communication by intercourse with a vessel lately unhealthy. With the little knowledge we have of the concomitant circumstances, it would be rash to speculate on this question farther than to remark, that, as this communication appears to have taken place off Cape Formosa, which forms the western boundary of the Bights of Benin and Biafra, there is a mere possibility that the crew of the Tender may have been exposed to the same atmospheric causes to which that of the Sybille were subjected.

We must, however, proceed to notice very briefly the views of Mr Boyle, on the nature and most proper treatment of the disease. Observing the disease to be most fatal to the old, the worn out, and the debauched, and that its greatest peculiarity was the red, dry but unfurred state of the tongue, Mr Boyle thinks that the Sierra Leone epidemic was more an affection of the nervous than of the circulating system. Reaction, he remarks, did not always occur, and when it took place, it always bore a direct proportion to the previous apparent strength of the patient. When pain of the head or other local complaint was once removed it seldom recurred, and if it did, it was generally completely subdued by the application of four or six leeches. In many of the cases no inflammatory symptoms occurred; the pulse and temperature are stated to have been below par, the former sluggish and indicative of debility. These circumstances led to treatment consisting of leeching, cupping, and blistering the parts affected, the employment of the warm bath and *pediluvia*, the administration of mercury internally and externally, and the occasional use of absorbents, alkalies, and medicines, antispasmodic and sedative, without stimulating.

It would be improper to speak severely of Mr Boyle's pathology, considering how assiduously he appears to have studied the nature of the African endemic and epidemic disorders. But we must say that his ideas are too vague and loose, and his inferences not altogether conclusive. How the fatality of the disease and the red unfurred tongue, can indicate merely an affection of the nervous system, it is difficult to understand. An affection of this system may exist in all fevers; but is it not occasioned by the state of the capillary vessels and the circulation of the nervous system? The argument derived from the little complaint made of headach or pain may be set aside as altogether fallacious. When a patient in fever makes little or no complaint, it indicates a deep and serious lesion of the brain, affecting and impairing its power of receiving impressions. The red tongue, it may also be observed, indicates great derangement in the secreting functions, and therefore in the vessels concerned in that process, and is no doubt, as it may be seen in bad fevers in this country, closely connected with general derangement in the secreting vessels, in the whole tract of the alimentary canal. When, indeed, it is well established by numerous observations, that the tropical fevers, whether endemic or epidemic, betray a singular tendency to disorganization of the capillary vessels, distributed to the mucous membranes of the alimentary canal, and even those of the brain and skin, it is rather odd to maintain that the febrile process is chiefly an affection of the nervous system, and to attempt to control this disorganization by mere leeches or cupping. We think it is clear that nothing short of blood-letting, which should make a powerful impression on the vascular system, and practised early, can be adequate to avert so pernicious and uniform a tendency. The early employment of this measure is an indispensable condition, because, unless it is made to operate on the capillaries before the diseased action has had time to disorganize them, it impairs the strength of the patient without arresting this fatal disposition. Next to blood-letting, the application of cold to the surface, and especially to the shaven scalp, is the most powerful means of counteracting the effects of the febrile process. Of the mercurial practice we have partly spoken already, when noticing its use in the endemic fever; and we fear the same arguments are applicable here. Beyond the vigorous and repeated use of calomel as a purgative, varied by that of the blue pill in the same way, we should expect from the use of the mineral constitutionally, no advantage which could not be derived from its use as an evacuant.

Here, however, we shall pause for the present, and reserve for another opportunity the further consideration of the other subjects discussed in the work of Mr Boyle.

We cannot conclude this article without saying, that the public must be prepared to expect to hear of greatly more general and fatal epidemics in the different European stations on the West African coast. It must not be expected that the fever of 1829 will be the last. The whole coast, from Senegal to the equator, possesses in abundance the seeds of endemic fever, which in every irregular or unfavourable season will ripen into epidemic vigour, break out, and exercise its ravages unopposed on the European population first and chiefly, and then on the coloured. These epidemical visitations will become more frequent and more fatal, as the colonial establishments become more numerous and more populous. Of every fresh importation of Europeans, the majority, or at least a large proportion, will, from time to time, be cut off without the possibility of resistance or escape. Against this there are unluckily few effectual resources, unless at an expence of human life perfectly frightful to contemplate. For if rivers and coasts be embanked, if bush and mangrove be cut down, and if the surface be cleared and cultivated, a very large proportion of those employed must necessarily be swept away by the consequent disease. The chief sanitary measures that are practicable are those which depend on individual caution and prudence. Sobriety and temperance, avoiding equally night air and dews, and exposure to the meridian sun, the use of flannel clothing, and the rigid observance of personal cleanliness, are the great means which can secure individuals from attacks.

The work of Mr Boyle is very well calculated to communicate a just idea of the insalubrity of this coast. He appears to have long been familiar with it, and to have observed its local peculiarities with care and attention. It is unfortunate, however, that such works are either not known to those who are engaged in colonization and in the selection of proper places, or are not perused by them. The present work is dedicated to the Right Honourable the Colonial Secretary; and it will not be deemed impertinent, we trust, to express the hope, that his Lordship will spare some time from the public duties of his office, to understand the insurmountable obstacles to this incurably unhealthy coast ever becoming a useful or profitable establishment.

ART. II.—*A Critical and Experimental Essay on the Circulation of the Blood; especially as observed in the Minute and Capillary Vessels of the Batrachia and of Fishes.* By MARSHALL HALL, M. D. F. R. S. E., M. R. I. M. Z. S., &c. &c. London, 1831. 8vo. Pp. 187.

ACCIDENT alone has diverted our attention from the writings of Dr Marshall Hall; and we embrace the earliest opportunity of recalling the notice of our readers to the researches of a physician who has long distinguished himself by the assiduity with which he cultivates medical science, and whose views are always original and interesting, and very often useful. We have selected for notice on the present occasion the most recent of his writings, because it contains some valuable illustrations of that most important problem in physiology and pathology, the motion of the blood in the capillaries; and we cherish the hope that we shall have an early opportunity of taking a retrospective review of those papers which have been hitherto omitted to be noticed.

In a short introductory discourse on the principles of investigation in physiology, Dr Marshall Hall impresses the value of observations of examples of monstrous structure, of the variations afforded by comparative anatomy, and of the effects of accidental injuries on the organs of the human body, and in the employment of experiments, of being sparing in their use or their repetition, but when this is requisite, to perform them in such manner as shall furnish accurate and unequivocal results, and thereby supersede the necessity of repetition.

The first subject investigated is the anatomy of the capillary vessels. These are obviously distinct, Dr Hall remarks, from arteries on the one hand, and veins on the other. Instead of becoming smaller by subdivision like the former, or larger by union like the latter, they retain a uniform character, and are distinguished by continued and successive union and inosculation. To determine whether there be any difference between the capillary vessels of the system and those of the lungs, Dr Hall examined, under the field of Dollond's achromatic microscope, the fin and tail of the stickleback, the web of the frog's foot, the mesentery of the toad, and the lungs of the salamander, frog, and toad.

In the tail of the stickleback, (*Gasterosteus aculeatus,*) the arteries run along each border of each ray, and at its extremity the artery reflected is converted into a vein, which pursues a similar but retrograde course along the outside of the artery. The artery, both in its course and at its extremity, gives off a few capillary vessels, which inclose large spaces, and then join the veins. At the point where the ray is bifurcated the artery gives a branch which, crossing the ray, divaricates into two smaller branches, which run along the inner margins of the respective rays, and, reflected at their termination, communicate with veins which ultimately unite, and crossing the ray join the principal vein. In this course the artery sends and the vein receives a few capillary vessels.

The arrangement of vessels in the web of the frog's foot is more complicated. Though the large arteries and veins run as in the large MAMMALIA, along the sides of the toes, the former giving and the latter receiving an equal number of branches, the minute arteries are characterized by their straighter course and smaller size, by the lighter colour and more rapid motion of their contents, and by a distinct pulsatory motion, which does not extend to the capillaries. They are nearly equal in number to the veins. The latter, which first strike the eye, are tortuous, red, and present the most distinct view of the blood moving within their canals in single globules or successive chains. Though Dr Hall could in no instance detect any anastomosis or inosculation between the minute arteries, except in the mesentery of the toad, this arrangement was frequent among the veins; and it is remarkable, that in the anastomosing branches of two veins a double and contrary current of blood is usually observed, so that two currents may occasionally meet, stagnate, or retrograde. The purpose of this arrangement Dr Hall imagines to be that, as the motion of the blood in the arteries is forcible and rapid, but in the veins feeble and slow, the anastomotic communications may obviate stagnation, and facilitate the motion of blood in the latter order of vessels. In no instance could Dr Hall observe a distinct termination of an artery in a vein; and the medium of communication between these two orders of tubes is generally, if not invariably, capillary vessels. In the mesentery of the toad, however, he saw a minute branch of an artery reflected and pursue a venous course. But he has not yet determined whether such a vessel is a common artery afterwards terminating in capillaries, or is a genuine vein, as taught by Haller.

The manner in which the arteries pass into capillary vessels is the following. When the larger arteries have by successive subdivision terminated in tubes, which are successively smaller than those from which they issue, at a certain point of this subdivision, a small artery is observed to terminate in two, each of which is equally large as itself, and these vessels further traced, are observed not to terminate in smaller tubes, but to communicate with others of the same size as themselves. To this order of vessels, which communicate exclusively with others of the same calibre, and in which the blood is observed to move so much more slowly than they did in the decreasing vessels, that the motion of individual globules may be observed, the author justly restricts the denomination of *capillary system*. The object of the uniform diameter and its concomitant phenomenon, retarded motion, he thinks, is obvious, since by this arrangement the blood is retained in the vessels of organs a sufficient time for the accomplishment of the important functions of secretion and nutrition especially. The capillaries, therefore, are situate intermediate between the arteries and veins, and their characteristic is, that they form minute cylinders, and have a uniform diameter, while the arteries and veins are conical. Alcohol applied to these vessels has the effect of interrupting the motion of the blood in them; and, by applying this fluid to the web of the frog's foot, two layers of capillaries are brought in view, one superficial, in which the motion of the blood is suspended, the other deep-seated, in which it is still moving.

Of the pulmonary capillaries the arrangement is slightly modified. The division of the minute arteries into capillaries is more immediate, and without those successive subdivisions observed in the arteries of the systemic circulation. On the other hand, the capillaries open into the veins with equal abruptness, and without the gradual reunion observed in the minute veins of the systemic order. These ultimate arteries also give off capillaries not only from their extremities, but from their sides by lateral pores; and the veins receive capillaries in the same manner. The arteries and veins in no case communicate by direct anastomosis, at least in the lung of the salamander. The intermediate vessels, on the contrary, which constitute the capillaries, inosculate in every possible manner, and infinitely more frequently than in the systemic order, and hence constitute an extensive net-work of cylindrical tubes of uniform diameter. Through this net-work the blood flows from the arteries with extreme rapidity, in a uniform current; and as each artery communicates with several capillaries, it appears to run like diverging rays from a point or line, and to converge in the same manner when it proceeds from the capillaries, opening into the pulmonary veins. It can scarcely be doubted, that one effect of this arrangement is to distribute the moving globules over as extensive a surface as possible, and thus to expose the greatest possible number of them to the inhaled air.

This is the distribution of the capillaries in the lung of the salamander. In the frog and toad, the lungs of which combine the vesicular and the cellular arrangement, it is much the same, with this exception, however, that the arteries, previous to their termination in capillaries, follow the internal margins of the vertical meshes of which the vesicles consist, while the veins run along their internal margins.

This account of the physical characters and arrangement of the capillaries is by far the most distinct and intelligible that has yet been given. It applies, indeed, solely in its present state to the capillaries of the saurial and batrachoid reptiles; but there is every reason to believe, that the same arrangement takes place in the mammated class of animals.

The second subject which Dr Marshall Hall undertakes to determine, is the character of the powers by which the blood is propelled through the vascular system. After taking a view of the opinions of Galen on the motion of the blood, of the doctrine taught by Harvey, that the heart is the sole agent, and more fully illustrated and enforced, especially as to the passive part of the arteries, by Haller, Spallanzani, and Bichat, he proceeds to consider the force of the facts and arguments by which this doctrine was refuted by Hunter and Scarpa, and then adverts to the hypothesis originally advanced by Huxham, and recently maintained by Dr Carson and Dr Barry, regarding the influence of atmospheric pressure. In this discussion, Dr Marshall Hall is inclined to deny the justice of the opinions of Haller, Spallanzani, and Bichat, that the action of the heart is confined to the arteries, and further to maintain with Tourdes, Hunter, and Scarpa, the influence of the arteries in promoting the motion of the blood independent of the heart. In addition to the usual anatomical argument by which this doctrine is upheld, namely, the alleged greater thickness and strength of the middle arterial coat, as it recedes from the heart, Dr Marshall Hall has adduced several arguments from microscopic observation.

According to the evidence derived from this source, while the natural, that is, the unexcited circulation, is rapid and slightly pulsatory in the arteries, but equable in the capillary and venous systems, if the motion is in the smallest degree impeded, the pulsatory movement is stated to become manifest in the whole three systems of vessels, arterial, capillary, and venous. In this instance, therefore, it must be admitted that the action of the heart is continued to the capillaries and the veins.

To demonstrate the muscular power of the arteries, Dr Marshall Hall appeals to the cases of acardiac or heartless fœtuses and heartless animals, to the circulation in fishes and crustaceous animals, and to the effects of the experiment of removing the heart in cold-blooded animals.

It is doubtless the fact, that fishes are destitute of systemic heart, and if this organ be indispensable to circulation, the blood of this class is propelled by the power of the arteries alone. It is also the fact, that in this class the arteries are of very considerable thickness and strength, and seem destined by these additional powers to perform the duty of the heart in other classes. So far, therefore, as these considerations go, they must be allowed to prove that in the class of fishes the blood is propelled chiefly by the power of the arteries. We must be allowed to say *chiefly*, because the influence of what is denominated the *vis a tergo*, or the gentle but uniform force with which these vessels are supplied with blood by the pulmonary veins, must not be overlooked, and must be admitted to have an influence by no means trifling in the propulsion of the blood through the arterial system. As to the thickness and force of the proper middle arterial coat, for we avoid the hypothetical denomination of *muscular*, in certain senses that is an argument against the influence of the arteries in the circulation in the warm-blooded classes. No doubt can be entertained of the fact, that the arterial tunics are thick, well-marked, and powerful in the finny tribes; and from this it may be inferred, that in them these qualities are intended to compensate for the want of systemic heart. But when these tunics are found comparatively much thinner in the mammiferous and winged classes of animals, in which their origin is provided with heart, it must follow that in these two classes their contractile powers are not wanted.

In the CRUSTACEA, in which the systemic arteries alone are provided with heart, this organ, it is argued, must have the effect of propelling the blood not only through the arteries and capillaries, but the venous system, and the branchial capillaries and veins, till it is again brought to the aortic heart. But where is the difficulty, it may be asked, in the blood after it has been brought to the branchial arteries, being conveyed through them into the capillaries and veins? The uninterrupted supply of blood which is incessantly poured from the veins into these vessels must itself be a cause of propulsion. But, at all events, the slowness with which the blood moves through the gills of the crustaceous order of animals, in order, apparently, to enable these organs to expose every particle thoroughly to the air, which is so widely but sparingly diffused through the element in which they live, seems scarcely to require a branchial heart for its propulsion. The justice of this view is illustrated by what we find in the Molluscous Class. In two of its orders, the Acephalous and Gasteropodous MOLLUSCA, there is no branchial heart; and the blood is made to move through the branchial arteries chiefly by the continued pressure of the column on the *venæ cavæ*. Some of the gasteropodous *genera*, indeed, breathe air not diffused in water, but directly from the atmosphere; and slowness of aeration, therefore, cannot be received as the sole reason for the want of branchial heart in these genera. But when it is considered that in other genera which are also hydropnous, or breathe air only diffused in water, the branchial heart is still wanting, and that in the whole of the cephalopodous order, which again live and breathe in the watery element only, the gills are provided with a branchial heart, the argument derived from the want of this organ in the CRUSTACEA dwindles into a very inconsiderable matter. There must, in short, be some reason, which is not yet explained, for the presence of a branchial heart in the cephalopodous MOLLUSCA, and the want of it in the other two orders, and in the CRUSTACEA.

The experiment of removing the heart in reptiles, performed by Haller and Spallanzani, has been three times repeated by the present author with the following results. Immediately after the enclosure of the aorta of a frog in a ligature, the circulation o the web, which was previously vigorous, was arrested first in th capillaries, and then in the veins. "In the arteries there was single oscillatory motion of the blood for ten or fifteen minute The globules of blood proceeded slowly onward for some seconds there was then all at once a rapid retrograde movement of the blood, apparently through the same space. This oscillation was repeated. The globules of blood were again moved alternately in progressive and retrograde directions as before.

"It appeared to me that the artery gradually contracted in successive portions, and slowly emptied itself, by propelling the blood in a continued stream along its final branches; that it then dilated suddenly, and drew the globules of blood in a rapid retrograde course."—"During the first contraction of the artery, the blood would be propelled along the capillaries and veins. During the succeeding contractions and relaxations of the artery, the globules would merely oscillate, being driven forwards and drawn backwards alternately."

We give the description of the results of this experiment in Dr Marshall Hall's own words, because from these he infers, that "it would appear almost certain that the arteries possess a muscular contractile power." We must nevertheless remark, that the same phenomena were witnessed in all their varieties, and most minutely described by Spallanzani, who, however, drew from them the opposite conclusion, that the whole of the oscillatory motions were occasioned by the sufferings and strugglings of the animal, and that excluding such causes, the capillaries gave no proof of irritability or contractility.

As to the argument of the alleged augmented impulse in particular arteries, which Dr Marshall Hall has justly remarked is admitted by Laennec, as a proof of the muscularity of arteries, there is, we are satisfied, in it a degree of fallacy, which we should like to see removed. There is in certain arteries, either from mechanical obstruction at their extremities, or dynamic irritation in the textures to which they are distributed, a tendency to impede the free motion of the blood through them. The artery or arteries thereby become overloaded, distended, and swollen, and the simple cardiac impulse is increased in intensity, both by the augmented mass of blood through which it is transmitted, and by the force with which the incumbent parts resist the further distension of the overloaded blood-vessel. This fact was clearly established by the experiments of Dr C. Hillier Parry; and unless the force of these experiments were neutralized by others equally conclusive, we cannot see how the inference now stated can be questioned. In short, it may be asserted, that, in the instances now alluded to by the author after M. Laennec, it was not so much augmented impulse, as *augmented* resistance, the impulse remaining the same.

A fifth argument in favour of the muscular power of the arterial tubes, Dr Marshall Hall deduces from the effects of elevated temperature on these tubes. The experiments of Edwards showed that frogs and toads die rapidly in water, the temperature of which is above 107° Fahrenheit. Dr Marshall Hall, aware of this, had further observed, that the batrachoid reptiles, on exposure to water of 120° Fahrenheit, die almost instantly with rigid contraction of the superficial muscles. The heart immersed in water of this temperature immediately becomes shrunk, pale, and rigid. As this phenomenon, therefore, furnishes a distinctive test of the properties, and consequently of the presence, of muscular fibres, the author thought it might be confidently employed with that intention; and, in point of fact, while a fibre of longitudinal muscle was shortened and made rigid, a portion of nerve or membrane underwent no change. An artery and vein, therefore, were placed in warm water; and though both were previously equally flaccid on glass before immersion, the artery immediately became rigid and cylindrical, while the vein underwent no evident change. This is certainly an important experimental fact; but it is still liable to the objection, that the contraction and rigidity might depend on the chemical change effected in the albuminous substance of the arterial tube.

The ingenious author, indeed, himself, with candour which cannot be too much commended, admits that none of these arguments are absolutely decisive of the question, and that the facts afford no conclusive proof of the muscular action of the arteries; and even in the last experiment he allows that there is still room for doubt. This doubt, however, he thinks must be altogether removed by the fact which he has discovered, of an artery in the frog and toad which pulsates distinctly for a considerable time after the removal of the heart.

> " The artery to which I allude is a branch from each of the arteries, which, in the frog and toad, after separating at a short distance from the heart, rejoin, and form the aorta. Pursuing its course backwards and downwards, it passes under the transverse process of the third *vertebra,* where it is bound down, yet very tortuous. When the viscera are removed, two pulsating points are distinctly seen at this part. On a minute examination, these pulsating points are found to be portions of cellular and muscular texture above and below the transverse process just mentioned, moved by the contraction of a subjacent artery."
>
> " On removing the textures carefully, and on the removing the skin from the back of the animal, the part along which the artery passes on emerging from beneath the transverse process is sufficiently thin and transparent to admit of its being placed under the microscope. The artery is then plainly seen to pulsate, becomes straighter and paler at each contraction. The adjacent textures

are moved at the same time, and the blood is frequently seen to circulate in a branch of the same artery situated very near it."

" In this part," the author resumes, " we have the most, and, I may add, the only indubitable proof of a contractile action in an artery."

" It is interesting to contrast the appearance of an automatic contraction in this artery with that of dilatation, the effect of the impulse of blood sent from the heart, as seen in the principal pulmonary artery in the BATRACHIA. While the former becomes straighter and paler, the latter is rendered still more tortuous, and is still more distended with blood. Mr Hunter justly observes ' arteries during their *diastole*, which arises from an increased quantity of blood being thrown into them, increase much more in length than width, being thrown into a serpentine course ; therefore, instead of the term diastole, it should rather be called the elongated state.'

" The arteries are indeed a second heart in an elongated form. Their function appears to be so perfectly performed in health, that all visible pulsation from their action is lost at their extreme branches. The blood is carried along at last by such gentle undulations, caught in their full force from the heart, but softened, first by the elasticity, and then by the contraction, of successive portions of the arteries, that its flow seems to become uniform. It is as the powers of the system languish, or when impediments to the action of the successive portions of the arteries exist, that the blood is seen to move in their minute branches in a pulsatory manner."

It is unquestionable that the vague and uncertain knowledge of the structure of the capillaries has led to much misunderstanding regarding their properties. The precise ideas which his views of the capillary system of vessels have enabled Dr Marshall Hall to communicate, may be of the utmost utility in determining the properties and actions of these vessels. Haller appears to have comprehended them under the general head of arteries, or at least not to have drawn any marked distinction between them and the minute arteries. As he denied irritability in the arterial coats, Whytt seems to have inferred that he also denied any property of this kind in the capillary vessels; and as it was imagined by the great oracles of the Edinburgh school at that time, that, without the existence of such a power in the minute vessels, it was impossible to explain not only the phenomena of such healthy processes as secretion, and such morbid ones as that of inflammation, but the effects of various stimulating or irritating remedies, Whytt undertook in 1755, with much zeal and ingenuity, to prove that the capillaries are irritable;* in 1757 Ivan Jacques Van den Bos, a pupil of Winter, professor at Franeker, proved that the arteries are particularly irritable,[*]—both with evident reference to the irritability of the capillaries as a corollary; and Verschuir, in 1766, demonstrated experimentally the irritability of the arteries, with proofs so conclusive that Haller was obliged to admit some muscular power in the large arteries.[†] It was two years after this, in 1768, that Spallanzani published those celebrated experiments on the motion of the blood in the capillaries, in which he made it appear that whatever deviations from uniform motion were observed, evidently arose from the sufferings and struggles of the animal. While the existence of the muscular fibres of the arteries, and their irritability, were in like manner denied by Arthaud in 1771,[‡] their irritability was maintained in 1786, both experimentally and argumentatively, by Henry Van den Bosch,[§] and Christian Kramp,[||] still, as before, with reference to the theory of inflammation and congestion. The doctrine of vascular irritability, thus maintained by so many advocates, was very soon generally admitted into pathology, to the exclusion of the mechanical hypothesis of obstruction, and the chemical one of acrimony; but though it was very ably explained by Magenise, it may be doubted if it ever would have been so generally adopted and recognized, if it had not been applied by the ingenuity, and illustrated by the popular talents and luminous method of Cullen. It is nevertheless a singular example of the revolutions which medical theories undergo, and of the strange uses to which they may be put, that, though Haller invariably and uniformly maintained the total independence of irritability on the nervous system, the patrons of the pathological theory of the irritability of the capillaries added to their other deviations the doctrine of the sovereign influence of the nervous system over these vessels. The doctrine has, notwithstanding various modifications and rectifications derived from J. Hunter, Bichat, Thomson, Wilson Philip, Hastings, and some others, remained in its essential features much the same. A ray of light of a new and original character has been indeed thrown on the mechanism of the capillary circulation by the views of Reuss, and the experiments of Dutrochet. In other respects, however, the theory may be said to retain its original hold of the minds of physicians.

---

* Inquiry into the causes which promote the circulation of the fluids in the very *small vessels* of animals.

The validity of this doctrine is questioned by the present author, who maintains that there is no proof that the capillary vessels are irritable. He contends, in the first place, on the ground of repeated careful microscopic inspection, that the flow of blood in the capillaries is under the influence of powers in every instance extraneous to the action of these vessels. In other words they are under the influence of the action of the heart, of the contraction of the membranes of which the web or other part submitted to experiment consists, the motion of the blood in the veins, and various other causes extraneous to the system of capillary vessels. The inference deduced by Dr Wilson Philip from the effect of instantaneous destruction of the brain on the capillary circulation in the frog, he thinks is neutralized by his own experiment of removing the heart in the same animal. The influence of the arteries in this experiment, he thinks, is not sufficiently distinguished from that of the capillaries; and the muscles are necessarily thrown by such injury into spasmodic action, and may therefore act on the capillaries with sufficient power to modify the motion of their contents. The argument derived from the effects of irritating substances are disposed of in a manner little less summary. The motion of the capillary blood, he maintains, in such experiments, is modified by the pain inflicted by the struggles of the animal, and by the chemical action of the substances on the membranes of the web, or the parietes of the vessels. "*Ventre St Gris*," says Henry IV. "il me semble que *tous les deux ont raison*." Most physiologists have laboured to demonstrate arterial tissue to be muscular and irritable, with the view of applying irritability as a corollary to the minute arteries and capillaries which elude the scrutiny of the anatomist. While Dr Marshall Hall labours to prove the arteries to be muscular in structure and irritable in property, he demonstrates that the capillaries are altogether void of this vital property. We wish to be impartial, and we therefore give the views and arguments of the author as we find them. We fear, however, that the question cannot be determined in this easy and summary manner; and though we admit the uncertainty of the experiments of the irritabilists, we can scarcely yet bring ourselves to believe that the capillaries are wholly void of this or some similar property.

---

[*] De vivis humani corporis solidis. Leidae, 1757. 4to.

[†] Dissertatio Inaug. de Arteriarum et Venarum vi irritabili ejusque in vasis excessu, et inde oriunda sanguinis directione abnormi. Groningae, 1766.

[‡] Dissertation sur la dilatation des arteres et sur la sensibilité. 8vo, Paris, 1771.

[§] Theoretische und practische Bemerkungen ueber das muskelvermogen der Haar-gefasschen; 8vo. Munster, 1786.

[||] Diatribe de vi vitali arteriarum. 8vo. Argentor. 1786.

Dr Marshall Hall, noticing the influence of atmospheric pressure operating through the organs of respiration in promoting the motion of the venous blood, as originally suggested by Huxham and Carson, and lately demonstrated by Dr Barry, without attempting to consider the merits of the question as controverted by Dr Wilson Philip, adduces a fact which is important in showing the influence of respiration on the motion of the blood. He remarks that, in first placing the web of the frog under the field of the microscope, the circulation is for some minutes suspended, afterwards proceeds rapidly, and again from time to time undergoes occasional interruptions on pressing or touching the animal. These interruptions he traces to the influence of fear on the animal in which the circulation is then suspended, and which is afterwards renewed as soon as it has become accustomed to its new situation. As the effect is readily produced by pressure on the animal's thorax, so as to suspend respiration, the author infers that the interruption in the circulation depends on previous interruption in the action of the respiratory muscles.

The influence of the brain and spinal chord on the circulation is next considered. This subject has been investigated experimentally by Spallanzani, Fontana, Whytt, Legallois, Wilson Philip, Mr Clift, Flourens, Breschet, and others. Whytt maintained that the influence of the brain and spinal chord was not necessary to the action of the heart. The experiments of Legallois led to the conclusion, that the regular action of the heart is chiefly under the influence of the spinal chord, and that, when this part of the nervous system is destroyed, the only motions which the heart exhibits are those of general muscular irritability. Those of Wilson Philip on the frog, and Clift on the carp, led to the opposite inference, that the motion of the heart and capillaries is altogether independent of the influence of the brain and spinal chord, since they retain their action after the total destruction of these organs. From the experiments performed by M. Flourens, that physiologist drew the conclusion that the nervous system exercises at once a general and absolute influence over the energy and duration of the motion of the blood, but a special and determinate power on its individual constituent elements. He further infers, that the capillary circulation is neither more exclusively nor less completely under the influence of the nervous system than the vascular circulation, but that it more quickly betrays the effects of the nervous influence, simply because it is more remote from the centre of the organs from which that influence emanates, and that it is in short a more delicate index of derangement in the nervous functions than any other part of the vascular system.

These doctrines Dr Marshall Hall thinks he has good reason, from the results of experiments, to modify in the following manner. The action of the heart, which survives destruction of the brain and spinal chord, differs not in kind, but in power and degree only; yet its enfeebled action must be allowed to be sufficient proof of the fact, that the heart and vessels require the influence of the nervous system. The moment the influence of the brain and spinal chord is withdrawn by their destruction, the action of the heart is impaired and enfeebled, and its irritability fails, and is gradually nullified. The continuance of its contractions for some time is nevertheless totally inadequate to maintain the vascular and capillary circulation. These inferences are established by the results of the following experiment. On removing the brain o a frog the circulation of the web was as vigorous as before; afte the destruction of the spinal chord by a wire, it became langui first at the extreme margins, then at the centre, and finally ceased. The heart in the meantime continued to beat with appare vigour fifty-two times in the minute. The blood in the lun moved freely in one large vessel, and slowly in one or two c pillaries. This motion was soon reduced to mere oscillation. In the mesentery there was only a feeble circulation in the large vessels: yet the heart continued to beat thirty-six times in the minute an hour and a quarter after the destruction of the spinal chord. Scarcely any blood was lost. In a similar experiment, after destruction of the brain and chord, so slowly as to obviate shock, the circulation of the web became gradually slower and feebler until it ceased. The arterial motion became slow, like that of the veins, then oscillating, as when the heart is removed. The circulation gradually ceased in the capillaries and veins of the system, yet survived in one or two large vessels, and even one or two capillaries of the lungs; while the heart continued to beat vigorously and regularly at the rate of forty-eight times in the minute.

The influence of the nervous system on the organs of respiration, however, is not here distinguished from that on those of circulation. Dr Marshall Hall finds, that, after destroying the *medulla oblongata*, on which respiration is understood to depend, that action ceases indeed entirely and permanently, yet the circulation undergoes only a temporary abatement of energy, and gradually and perfectly recovers. After thirty-six hours, indeed, the respiration is annihilated, but the circulation is vigorous. On repeating the experiment the result was the same. The circulation, therefore, Dr Marshall Hall infers, is as little under the influence of the spinal bulb as of the chord, and depends as little on the continuance of respiration. This inference, however, we must remark, though just with regard to the cold-blooded animals, may not be applicable to those with warm blood. In the destruction of the brain and spinal chord by successive portions at distant intervals, it appears further from these experiments, that, though the pulmonary respiration is annihilated, the cutaneous may subsist, and the circulation does not immediately cease. Dr Marshall Hall, therefore, is led to the conclusion, that the animal may subsist by means of cutaneous respiration, and by the influence of the gangliar nerves alone. It appears to be on the same principle that the circulation in part survives the destruction of the brain and chord.

Dr Marshall Hall next endeavours to determine the effect of the application of substances with stimulant properties to the brain and spinal chord; and the results which he obtained in this inquiry differ from those recorded by Dr Wilson Philip. While the latter inquirer found that alcohol applied to the muscular fibre impairs its sensibility, and that, applied to the brain or spinal chord, it increases the action of the heart, and that solutions of opium or tobacco increase it in a less degree, and are followed by a great abatement in energy; Dr Marshall Hall found the application of alcohol or laudanum enfeeble the circulation of the web, watery solution of opium obliterate the circulation, and induce complete tetanus, and alcohol applied to the surface of the brain and chord, after inducing insensibility by laudanum, produce no acceleration whatever, either in the beat of the heart or in the motion of the blood in the web. This tetanic affection induced by the application of solution of opium to the surface of the spinal chord or brain, Dr Marshall Hall represents to be exactly similar to that induced by strychnine.

In observing the effects of the application of irritants to the web of the frog, it is necessary to be aware that the first effect is the production of pain and fear, and that both of these circumstances influence powerfully the circulation of the capillaries. They are, indeed, sufficient of themselves to arrest temporarily the motion of the blood, though the author thinks that pain must of itself accelerate. It may then become a question whether it be sufficient to neutralize the retardation occasioned by fear. But, independent of this, pain is followed by struggles, which cause the blood to stop, to oscillate, and to become irregular in motion. These substances must also, the author argues, constrict and corrugate the membranes of the web, and the texture of the subjacent vessels, and even affect the contents themselves. These considerations demonstrate the extreme difficulty of distinguishing, amidst so complicated an assemblage of phenomena, the essential and necessary from the accidental and accessory. Under this impression, the author reserves the prosecution of this department to another opportunity.

The results of this inquiry may be applied to elucidate the influence of other organs and parts of the animal body on the circulation, and more particularly, the effects of great and severe injuries, which kill by nervous shock or concussion. The only question of importance is, whether this influence operates through the medium of the nervous system, or simply by the general connection subsisting among different parts of the animal frame? In this inquiry it must first be determined, whether the organs are connected by the nervous system or not; but it is manifest that this can only be determined by experiments and observations, which indicate also the influence in either way. Several experiments were performed by the author to determine this question;

but we do not think they tend to any very definite result. The general conclusion is, that since in cold-blooded animals previously rendered insensible by laudanum or alcohol, or by destruction of the brain and spinal chord, and thereby deprived of pulmonary respiration, crushing the thigh is followed by cessation of the capillary motion, and that of the stomach is followed by temporary cessation and permanent abatement of the action of th heart, yet without indication of pain in either experiments therefore, the organic structure, and not the nervous system must be the medium of communication between the injured part and the heart. The injury is truly so complicated, and the results so much encompassed by various sources of fallacy, that, though it seems difficult to see how it can otherwise be conducted, it may be doubted whether it even admits of being determined in a positive manner.

In the course of these investigations, the author has been led to recognize in the tail of the eel a hollow dilated sac opening at its lower extremity into a vessel, which afterwards divaricates into several, which eventually terminate in a large tube at its upper extremity, and which he regards as a species of heart. It exhibits motion independent of that of the branchial heart, which beats only 60, while the former beats 160 times in the minute. This organ, therefore, Dr Marshall Hall denominates the *caudal heart.* The vessels which proceed from it appear to be distributed to the spinal chord. It seems to be the same with the circulation discovered by Professor Jacobson of Copenhagen in 1821, and republished in our 19th volume, p. 78, in the tail of the finny tribes.

The space which we have allotted to this article shows the value we attach to the contents of the volume of Dr Marshall Hall. Whatever opinion be entertained regarding the physiological conclusions at which he has arrived, we think it impossible to doubt, that the description of the characters and arrangement of the capillary vessels which he has been enabled to give, forms a most valuable contribution to the store of precise knowledge.

ART. III.—1. *Die Asiatische Cholera in Russland, &c.—The Asiatic Cholera, as it appeared in Russia in the years* 1830-31*; from Official Documents and Reports.* By Dr J. R. LICHTENSTADT, Professor of Medicine, &c. &c. and Physician at St Petersburg. Being the Continuation of the former work of the same author on the Asiatic Cholera in Russia in the years 1829-30. First and Second Numbers. *Berlin, 1831.* Haude and Spener. Pp. 334. Small 8vo.

2. *An Essay on the Epidemic Cholera of India.* By Reginald Orton, Surgeon, late of his Majesty's Thirty-fourth Regiment of Foot. Second Edition, with a Supplement. London, 1831. Burgess and Hill. Pp. 488. 8vo.
3. *Observations on the Nature and Treatment of the Cholera Morbus, now prevailing Epidemically at St Petersburg.* By George William Lefevre, M. D. Member of the Royal College of Physicians of London, &c. and Physician to the British Embassy at St Petersburg. London, 1831. Longman, &c. Pp. 96. 8vo.
4. *Papers relative to the Disease called Cholera Spasmodica in India, now prevailing in the North of Europe.* Printed by Authority of the Lords of his Majesty's most Honourable Privy Council. London, 1831. Winchester and Varnham. Pp. 38.
5. *Letter to Sir H. Halford, &c., President of the Board of Health, on the tendency of the proposed Regulations for Cholera; with Observations as to the Nature of the Disease and the course to be followed immediately on its appearance in a family.* By G. Hamilton Bell, Fellow of the Royal College of Surgeons, Edinburgh, late Residency Surgeon, Tanjore. Blackwood, Edinburgh, 1831. Pp. 16.
6. *Cholera Morbus. A Short and faithful Account of the History, Progress, Causes, Symptoms, and Treatment of the Indian and Russian Cholera, &c. &c. &c.* By John Austin, Surgeon. Hughes, London, 1831. Pp. 44.
7. *Published by Authority of the Lords of his Majesty's most Honourable Privy Council.—Papers relative to the Disease called Cholera Spasmodica in India, now prevailing in the North of Europe, with Extracts of Letters, Reports, and Communications, received from the Continent.* London, 1831. Winchester and Varnham. Pp. 73.
8. *Relation Historique et Médicale du Choléra-Morbus de Pologne; comprenant l'apparition de la Maladie, sa Marche, ses progrès, ses symptomes, son mode de traitement et les moyens préservatifs.* Par A. Brierre de Boismont, D. M. l'un des deux premiers Médecins envoyés en Pologne, Membre du Comité Central de Varsovie, &c. &c. Paris, 1832. Pp. 268. 8vo.
9. *Rapport sur le Choléra-Morbus. Lu à l'Académie* Royale

de Médecine, en Séance générale, les 26 *et* 30 *Juillet* 1831. Paris, 1831. Pp. 199. 8vo.

10. *Remarks on the Cholera Morbus, containing a Description of the Disease, its Symptoms, Causes, and Treatment, &c. &c.* By H. Young, M. D. London, 1831. Pp. 78.

11. *A Treatise upon Cholera Morbus, from the French of M. le Baron Larrey.* By Henry Paterson. Dublin, 1831. Pp. 29.

12. *An Antidote to the pernicious doctrines of Non-Contagion, &c. &c.* By Henry Bird. Chelmsford, 1831. Pp. 22.

ABOUT the time the account given in the last number of this Journal of the works of Mr Bell and Dr Hawkins was written, the Epidemic, or, as it now more conveniently called, the Malignant Cholera, after lingering for some months in Poland, suddenly began in the autumn to resume its march with activity; and it has since been making rapid and lengthened strides over various countries in civilized Europe. A great variety of treatises on the disease have in consequence appeared during the last three or four months in the different languages of Europe, the titles of a few of which have been placed at the head of the present remarks. The information thus accumulated forms so important an addition to what was formerly possessed, and appears in many respects so much more precise in its bearings on questions which in our former notices on the same subject were left undecided, that we are now placed in a convenient situation for resuming the whole inquiry,—a measure which is strongly pressed upon us by the circumstances in which this country is in its turn on the point of being involved. After invading successively the capitals of Poland, Russia, Austria, and Prussia, together with many lesser towns throughout these empires, the epidemic has at length touched our own shores, having passed by a long leap from the Baltic to the Port of Sunderland. In this city, which contains a population of 40,000 souls, the number attacked in the course of fifty days has been 425; and of these 164 have perished.

In its progress during the last three or four months throughout the more civilized countries of western Europe the Malignant cholera, as was predicted by professional persons acquainted with the features of its progress in Asia, has appeared shorn of a great part of its terrors. Instead of overwhelming a tenth, a fifth, or even sometimes, as at Astrachan, a third part of the population, the proportion it has attacked in St Petersburg, Vienna, Berlin, Hamburg, and most other towns in

Russia and Prussia, has varied from a seventieth to a two-hundredth only; and according to the appearances it has hitherto presented at home, it promises fair to be equally limited in its ravages in the British Isles.

It is at the same time necessary to warn the medical reader and the public,—and we hope this warning will also reach the public functionaries here and elsewhere, whose duty it is to watch and prepare for the approach of the disease,—that the circumstances of its appearance and progress in Sunderland do not by any means warrant the very sanguine expectations which many people, and among these, as we have reason to know, not a few persons in authority, have been led to form of the probable insignificance of its visitations. Misled by the ignorant conjectures and reckless averments of editors and other writers in the daily press, especially of London, many persons have been induced to believe, that there is little occasion to dread the arrival of the threatened visitor, or to make any serious preparation against its approach. According to these hasty speculators, the Malignant cholera scarcely makes any impression by its operations on the average mortality; it merely carries off a few old people and drunkards, who would have been carried off by other diseases, or, at all events, are as well out of the way, so far as the general good is concerned. So great, indeed, has been the impression produced on the public mind by such representations, that, if we do not greatly mistake, they even for some time tainted the principles, and governed the conduct of the Central Board of Health. In a letter addressed by that body to the Board of this city,—in reply to a proposal for refunding to Edinburgh and other cities the expence attending the necessary preparations, by means of an act for assessing all towns which may be visited by the disease,—the Edinburgh Board have been told that preparations on a very limited scale will be sufficient, as the progress of the disorder in Sunderland entitles the Central Board to conclude, that the degree to which it will prevail throughout the British Isles will be trifling. That it will be trifling, when compared with the terrible devastations it has committed in its course through Asia and Russia, there is much reason certainly to anticipate. But it does not absolutely follow, that, because its advance has been slow and limited in Sunderland, it will observe the same order of march in other towns in Britain; for in not a few of the towns of Russia it prevailed, for no apparent reason, to an extent equally slight as at Sunderland, although it raged with fury in other cities at no great distance. Besides, it may be seriously questioned, whether the amount of its prevalence in Sunderland, when thoroughly looked into, will really entitle the London Board or the daily press to address the public in the language they have employed. In the first fifty days, the number attacked has been 425, and the number of deaths 164; and although this number has nominally occurred in a town of 40,000 inhabitants, the persons attacked have been in a great measure inhabitants of Sunderland proper, the population of which is scarcely half that amount. When to this consideration is added the fact, that the epidemic is in all probability only at its height, or but little farther, and that consequently before it ceases the number attacked in the whole population will in all probability be 700 at the very least, the proportional extent of its prevalence is represented in its true light, and is seen to be far from inconsiderable. It is a larger proportion than what occurred in Berlin and Vienna, and falls little, if at all, short of the proportion that suffered in the great epidemics of Moscow and St Petersburg. It fully warrants the inference, that in a city of the size of Edinburgh, between 3000 and 3500 persons will be attacked in the course of three months; and, if the mortality should be the same as at Sunderland, the disorder will carry off in the same period about 1100 persons.

The threatened calamity, then, is a much more serious one than the public has been generally exhorted to consider. And we, therefore, earnestly trust that the local boards, which have been formed with singular activity throughout the whole country, will not allow themselves to be misled by any misrepresentations on the subject, from whatever source they may come, —but will go on steadily and zealously making all requisite preparations for encountering the disease. They ought especially to consider, that, if the disease has been limited in the extent of its prevalence in the middle of Europe, this has arisen in part at least from the extensive preparations made to receive it. The Central Board, indeed, instead of discouraging or limiting the employment of preparatory measures, ought, in our humble opinion, to have enforced the fact now mentioned strongly on the attention of all local boards, by assuring them, what is actually the case, that the degree of prevalence of cholera has appeared to follow very nearly the inverse ratio of the preparation made against it.

After these preliminary hints on a point not directly connected perhaps with the approaching comments, but which we could not forbear noticing on the present occasion, we shall proceed to the proper subject of this review. In what follows we propose to consider what light has been thrown by the numerous publications whose titles are prefixed,—on the circumstances which affect the prevalence and the mortality of malignant cholera,—on the question of its diffusion by communication from man to man,—and on the most appropriate treatment. The other topics embraced by the authors in their treatises will be reserved for future consideration. Before three months more shall have passed away, we may with some confidence anticipate much useful addition to our knowledge on the morbid anatomy and essence of the disease.

A most important inquiry, which has been hitherto scarcely touched on by authors on the malignant cholera, relates to *the circumstances which affect its prevalence and mortality.* Minute and accurate information on this head would be of incalculable service. Countries and cities not yet invaded might then know fully in what shape their unwelcome visitor would probably present itself, and what preparatory measures ought to be enforced. Information of the kind, however, is unhappily not very abundant in the works and documents before us.

The prevalence and malignity of cholera have appeared very generally to observe the same ratio. Wherever the greatest proportion of the population of a place has been assailed, there too the greatest proportion of the individuals attacked have perished. To this rule at least there have been very few, and no striking, exceptions. The whole Orenburg epidemic of 1829 indeed, constitutes an important exception. The proportion of the population attacked was generally higher, and the proportion of deaths among those attacked considerably less, than in the greater epidemic which commenced a year afterwards at Astrachan. But since the latter epidemic originated in that city, it has presented in general throughout its whole progress up the Wolga, across the country from the sources of that river to Moscow and Petersburg, through Poland to Warsaw, and finally along the Baltic shore to Berlin and Hamburg, the same uniformity of relation between its prevalence and malignity.

The devastations it has committed, however, have been most singularly various. Of all the cities it has visited, none has suffered so terribly as Astrachan. This place, which contained 15000 inhabitants in 1823, had a visit of the epidemic in that year, in consequence of which no more than 144 persons perished. But in 1830, the number carried off was 4043, or above a fourth of the whole population. The number attacked is not mentioned in *Lichtenstädt's* work, from which this fact is taken; but in the ten first days the attacks were three times the deaths. Another town, which seems to have suffered in about the same degree, is Berditschev in Volhynia. This place, which contains only "a few thousand inhabitants," had 900 persons attacked in thirty-one days, and 778 deaths, or the enormous proportion of seven-eighths of the seizures. The reason assigned for so dreadful a mortality will appear by-and-bye.—At the other end of the scale are placed Vienna, Hamburg, and Berlin, with some of the small towns of Russia. In Hamburg, out of a population of 120,000 souls, only 700 had been attacked, and 360 carried off by the pestilence up to the 4th of November, when the disease was believed to be quickly receding; and in Berlin, a city of 220,000 inhabitants, it was nearly extinct on the 6th November, after attacking 2077, and carrying off 1310 of these. In Vienna reports have been received down to the 21st November, from which it appears that in a population of 320,000, 3864 have been seized, and 1820 have died, and that the epidemic is nearly extinguished. In these cities the proportion attacked has varied from a 170th to an 83d; and the proportion of deaths in the population from a 333d to a 176th.—In the middle line, between the extremes constituted by Astrachan and Berditschev on the one hand, and the above-mentioned capitals on the other, stand Moscow and St Petersburg. At Moscow, as we have already reported in a former number, the attacks up to the 10th November 1830, had been 5451, and the deaths 2876, or about three-fifths. On the 17th March the epidemic was extinct, after lasting six months; and the total number seized in a population of 400,000 was 8576, of whom 4690 perished. In St Petersburg the disease lasted from the 26th June till near the middle of November; in the first thirty days its ravages were most alarming, for in that short space of time 7567 were attacked, and 3804 perished, (Gov. Papers, second fasiculus, 40;) but subsequently it diffused itself much less widely than was naturally thence anticipated,—the total number seized out of 420,000 inhabitants up to the 10th November, being 9235, and the total deaths 4755. Hence in these capitals the prevalence has been from a 45.5th to a 47th, and the mortality from an 88th to an 85th of their populations. Facts of this description might easily be multiplied to a great extent; but those already mentioned, which may be confidently relied on, as they are founded on careful statistical returns, are sufficient to show, that an extraordinary difference has been observed in the amount of devastation committed by the epidemic in various cities.

We shall now endeavour to lay down a few statements which have occurred to us in perusing the works now under consideration, as to the chief circumstances which have appeared to occasion these varieties. We shall confine our attention, however, only to those which are extensive in their operation, and appear to be well ascertained.

1. Among the circumstances which have seemed most obviously to regulate the prevalence of malignant cholera are free-

dom of intercourse and want of cleanliness. *Freedom of intercourse* will, we apprehend, account partly for the dreadful extent to which it prevailed in Astrachan; for at an active seaport the communication among the inhabitants is necessarily great, and the medical people from first to last upheld the doctrine of the non-communicable nature of the disease. Perhaps, however, the effect of free intercourse is more unequivocally shown in the case of St Petersburg. Here, during the first thirty days, the disease advanced with the most alarming rapidity, so as to attack a 55th part of the population in that short space of time. Had it continued at a rate even approaching this, and for the period during which it has usually remained in cities of the same size, or during which it actually did remain at St Petersburg, the proportion attacked would have been equal to that observed even where its ravages were the most widely spread. But instead of this, during the next three months and a half it seized only an additional 250th of the inhabitants, or little above a fifth part of the number previously attacked. This is so different from its ordinary course, which has generally been one of progressive increase and equally progressive subsidence, that some special reason for it must have existed; and such a reason, we apprehend, is to be found in the tumults and mobs which occurred at the beginning of the epidemic. The ignorant rabble of the Russian metropolis, confounded by the terrible features assumed by their new visitor, were led to ascribe its effects to poison, and of course gave the hospital attendants credit for its devastations, rose in tumultuary bands throughout the city, broke into the hospitals, violated the municipal rules as to seclusion of the sick, whom they carried back to their homes, and farther marked their insane progress by the murder of several physicians. A more effectual mode could scarcely have been devised for bringing all susceptible constitutions in the shortest possible time within the influence of the disease, if freedom of intercourse favours its dissemination.—Another striking fact showing the effect of freedom of intercourse is that wherever large bodies of men have been crowded into a small space, there the disease has spread to an extent and with a velocity quite unparalleled. Among the pilgrims of Mecca last summer 20,000 perished out of the total number of 50,000 during their temporary residence at the city of their prophet, which extends to about thirty days. In like manner, in regiments and armies in camp, or still more during a march of several days' continuance, and likewise in vessels at sea, its progress has been always amazingly swift, and in general extensive; for here there is both the greatest possible density of population and the utmost freedom of intercourse. But more of this when we treat of the question of contagion.

2. It is not easy to appreciate the amount of the effect of *Want of Cleanliness* in diffusing the disease and adding to its mortality; but all writers who have noticed the subject have agreed in assigning to this cause a very important influence. It will perhaps account for a considerable part of its superior prevalence in the most civilized parts of the Russian empire compared with what has since been observed in Germany and Prussia. The filthy habits, and greasy furs of the Russian, we suspect, have much to answer for in the diffusion of the disease. *Dr Lichtenstädt* has fortunately illustrated the effects of this modifying agent by a very pointed fact. It was stated above that at Berditschev in Volhynia, a place of a few thousand inhabitants, no less than 900 were attacked in thirty-one days. Among 764 of these were 658 Jews and only 106 Christians, although the Jewish population is far from being proportionally so great; and among the Christians attacked the deaths were 61.3 per cent. while among the Jews they were 90.7 per cent. The only reason assigned by the reporter for these extraordinary differences is the excessive disregard of cleanliness among the Jewish inhabitants. On the whole, although we repeat it is not easy to estimate the exact amount of the effect of want of cleanliness, or to abstract it from its concomitants, foul confined air, starvation, and the other ills of poverty, we have no doubt its influence is really very great, and fully warrants the vigorous measures which have been every where taken in Austria, Prussia, and Britain to remedy it.

3. Among the circumstances which regulate the prevalence and mortality of cholera, none seems to be more generally and strongly insisted on than *Relative Soundness and Strength of Constitution.* Differences of this kind will seldom perhaps account for extensive differences in the devastations committed by the disease in different places. But they will help to explain its excessive mortality in every place on its first arrival, and likewise some detached facts as to its degree of prevalence in particular bodies of men. It is universally observed, by those who have described the European epidemic, that the mortality has been excessive in the first weeks of its prevalence; and likewise that the great proportion of those who were then attacked were persons in the lower ranks, infirm, above the middle age, and of dissipated habits; and in an especial manner the influence of excessive indulgence in spirituous liquors has been strongly dwelt on. A remarkable proof of the superior susceptibility of the infirm and dissipated is, that the cholera, like other epidemic diseases, quickly absorbs all other pre-

vailing disorders. That is, those whose constitutions are prone to disease generally form the bulk of cholera patients, so that other diseases appear unusually limited in prevalence. Hence an interesting statistical fact remarked in recent times is, that even where the epidemic has diffused itself to a considerable extent, such as at Moscow, the mortality is after all not materially greater than twice the average mortality for the period of its residence.—An important observation relative to the influence of strength and soundness of constitution is, that whereever a body of men are collected together superior in bodily strength and general health to the average, the susceptibility of invasion by cholera is materially diminished. This observation is very pointedly brought forward by Dr Orton, among other interesting statements, for explaining the apparent irregularity and caprice of its course in India. He observes, that in India the mounted troops suffered much less than other corps of the army. Among the attacks made by the epidemic on the military during or after marches, as recorded in the Madras Reports, it is stated that thirty-three occurred in foot regiments, and only one in the cavalry, while among twenty-six marches where the disease did not occur, there were seven made by cavalry. The only obvious reason for this comparative want of susceptibility is, that the men in the cavalry corps are confessedly superior to the foot-soldiers: Their superior general health is acknowledged, which can only depend on their constitutions being sounder, and their habits more regular. This fact will explain some apparently very singular exemptions from the epidemic, which occurred among corps to all appearance similarly exposed to it, and which, from the supposed impossibility of accounting for them, have aided greatly in deepening the mystery thrown around the disease by the narratives of our East-Indian brethren. Thus, when the cholera prevailed generally and violently at Jaulnah, a brigade of horse artillery alone almost entirely escaped; at Hansi in Bengal a cavalry corps was completely exempted; two similar exemptions of bodies of cavalry are mentioned in the Bombay Reports; and in some instances the same singular exemption was remarked even in the light company of an affected regiment,—that company being composed, like the cavalry and artillery, of picked men —The excessively disproportionate mortality among constitutions deranged by habitual intoxication is a theme of never-failing admonition on the part of those who have given reports on the European disease. This, however, is no more than may be observed in all epidemic diseases. In the common fever of this country, drunkards form a very large proportion of the fatal cases,—so great, indeed, that we are always accustomed to look on a case of fever in a drunkard with an unfavourable eye, however mild it may seem to be for a considerable period of its progress. It farther appears, not only that habitual intoxication strongly predisposes to the disease, but likewise that a fit of intoxication during the prevalence of the epidemic is extremely apt to be followed immediately by an attack. Of this *M. Brierre de Boismont* has given the following remarkable illustration. "Three butchers visit a tavern, abandon themselves to every sort of excess, and drink till they are intoxicated, so that they are carried home senseless. A few hours scarcely elapse when the miserable men are seized with all the symptoms of cholera, which advance with such rapidity as to prove fatal to the whole three within four hours." p. 116.—Exhaustion of the constitution from previous diseases is another important circumstance which has appeared to promote the dissemination and increase the mortality of cholera. But the exact amount of this influence cannot easily be calculated. It is mentioned, however, by *Dr Orton* that convalescents in hospitals were often attacked in India; *Mr Jameson* observes, that an instance occurred in the Bengal service of a corps which had previously suffered much from fever having also suffered in an extraordinary degree from cholera; we have somewhere seen it noticed, but we do not remember where, that a great number of the cases at Moscow occurred among persons debilitated by a violent influenza which raged there not long before the cholera broke out; and *M. Brierre de Boismont* observes, in a general way, as consistent with his observation at Warsaw, that individuals weakened by protracted suppurations, habitual indigestion, and other debilitating maladies, sink in a very short time.

On the whole, there seems no reason for entertaining any doubt that this disease exercises its most virulent influence chiefly on persons of broken constitution.

4. Among the influencing circumstances none has been more strongly insisted on by the Russian medical men and Cholera Boards than *Peculiarities in Diet.* This is another cause, the amount of whose operation it is almost impossible to appreciate with any precision, although it is probably great. In the earlier history of the Russian epidemic an attack was so frequently observed to follow an unusual indulgence in the use of acid fruits, raw vegetables, and other articles of food which tend to irritate the intestines or disorder digestion generally, that the population were warned by authority of the danger of such indulgences; the importation of unripe fruits or even of fruits altogether, was prohibited during part of the autumn in some towns; and, following the experience of Russia, the Central Board of Health of this country, has even recommended the

maintenance of a moderately constipated state of the bowels as an important preservative during the prevalence of the disease.

5. The next circumstance which influences the degree of prevalence of cholera is a *Previous visitation of the Epidemic.* This valuable fact is brought forward in a prominent manner by *Dr Orton*, and seems well established. It was first stated by *Mr Jameson* in the Bengal Reports; but appears to have been since lost sight of till recalled by Dr Orton. The latter author remarks, that in most parts of India no great attention was paid to the fact; that, according to some hints thrown out in the Madras Reports, it was even supposed there that one attack is no protection against another; that undoubtedly instances of second attacks, or even many attacks, did occur; but that the contrary was the general rule, as was very ably stated in the Bengal Report.

> "It is not meant," says *Mr Jameson*, * * * "to deny, that in some rare instances the disease recurred at long intervals, when the individual had entirely regained his strength. All that we intend to affirm is, that such cases were exceedingly uncommon. To many of the medical officers who possessed large opportunities of observation, it did not occur to observe a single instance. Thus the centre division of the army hardly affords half a dozen instances." * * * "In the left division and Rajapootana force, according to the unanimous declaration of the Medical Staff, no case of re-seizure occurred after the strength had been fully restored. In the Nagpore force two or three instances came to notice, but all came under the strict denomination of relapses." * * * "With the Kuruaul division not a single case offered. The same immunity from secondary visitation was observed in every quarter where the epidemic prevailed, and we should perhaps be not far wide of the truth were we to affirm, that of the many myriads attacked the returns of the whole country do not afford a score of well-authenticated cases of a recurrence of the disease, after the removal of the debility and every other consequence of the primary attack."

These observations are peculiarly important, because, like the circumstance last mentioned, they afford a sufficient explanation of some apparent anomalies or eccentricities in the course of the epidemic, which are otherwise unintelligible. Many illustrations of the present statement are given by Dr Jameson; but the following, which is supplied by Dr Orton, is so remarkable in its details that we shall not dread the imputation of prolixity by transferring his narrative to our pages.

> "The thirty-fourth regiment was encamped at the Mount near Madras, in 1823, for the purpose of volunteering preparatory to embarkation for England; that is, of allowing the men desirous of remaining in India to transfer themselves to other corps,—a permission of which seven-eighths of them accept. In consequence,

apparently, of the excessive heat of the tents, and the great drinking attending the volunteering, a high degree of susceptibility to the disease was reproduced in them, which appeared to be excited into a severe epidemical visitation by a slight change in the weather. At the same time the disease was not prevailing in the fixed troops at the same station, nor any where in the neighbouring country, except in the fifty-fourth regiment, just arrived in India, and in the fifty-third, on its march. While the disease was prevailing in the thirty-fourth, a party of volunteers left it for the depôt at Poonamalee, eight miles distant. In the course of a week after their arrival there, twenty cases occurred in that party, but not one in the various other parties of troops previously there, though they were all mixed up together. These facts, however, are perfectly analogous. That little party was in the same situation as the fifty-fourth at the same time at Madras, with but this difference, that its susceptibility was owing to excessive heat and continued intoxication, while that of the newly-arrived corps was the original stock which exists in every body of people before being exposed to the disease. The fifty-third regiment shortly after underwent their volunteering in the same neighbourhood and under the same circumstances with the thirty-fourth, of exposure to heat in camp and intoxication, yet escaped the disease. And this is mentioned apparently as one of those contradictory facts which are to cut short all farther inquiry into the causes of this "inscrutable" disease. But on the foregoing principles how perfectly evident is the cause of the exemption. The fifty-third had but two months before undergone a severe visitation, induced by marching and atmospheric influence, by which its susceptibility was exhausted; and the causes which proved so fatal to us were insufficient to produce it in them."—P. 447.

6. The next influencing circumstance, and one of very great interest to many, is *Relative Station in Society*. We have often been asked what is the relative prevalence and relative mortality of cholera among the better ranks in the great towns which have been visited by the epidemic, but have never till lately had it in our power to reply satisfactorily to the question. All writers on the disease, both in its Indian and European progress, state in general terms that it affects most prevalently and most violently the lower orders, indeed the very lowest orders of society; but we suspect this statement has not always been guarded against the fallacy arising from the simple consideration, that the lowest orders of society are by far the most numerous part of the population, especially in great towns. The fact is, that very different results have been obtained in different cities.

M. Brierre de Boismont dismisses the subject with a general conclusion drawn from his own observation at Warsaw, and asserts that, from a review of all the causes which predispose to the disease, it must prevail almost entirely among the lower orders. Warsaw has certainly afforded a striking example of this rule. In a population of 80,000 inhabitants, 3912 were attacked between the 23d of April and 25th of June. From these it will be requisite to subtract 2637 cases among the military, because the tables do not state what proportion of that number were officers. Among the remaining 1275 there were only 59 persons of the better ranks, or 4.6 per cent., which is certainly much under the proportion subsisting between the total inhabitants of the wealthy and poorer orders.—Different results, however, have been obtained in other great cities. In Moscow, down to the 20th of last January, the total number of the inhabitants who died of the disease being 4588, it appears from an interesting table in *Dr Lichtenstädt's* work, that 526 belonged to the nobility and gentry, superior military officers, civil magistrates, churchmen, and merchants. It is probable that with these should also be classed a proportion of the citizens marked burghers in the list, (*Moskauische Bürger,—fremde Bürger,*) amounting in all to 830. But even excluding these, the deaths among the rest of the better ranks are 11.5 per cent. of the whole; which is probably not far from the proportion between the lower and better ranks in the total population, if indeed not somewhat above it.—Again, a result somewhat similar has been obtained at Berlin. According to the Berlin Cholera Gazette for 15th October, in a thousand persons attacked, there were 71 belonging to the class of professional men, public functionaries, schoolmasters, artists, merchants, manufacturers, and persons of independent fortune; to which may be also justly added under-clerks, of whom 28 appear on the list. This is a proportion of 10 per cent., or not much short of that observed at Moscow. We have not seen any accurate statistical returns on this point from any other great city hitherto invaded.

The cause of the difference in the prevalence of the disease among the higher ranks of society in different towns, will probably be found to depend on the relative degree in which the habitations of the two ranks are intermingled. In Moscow the nobleman's mansion is surrounded by the dwellings of his servants and dependants, and the two stations in society are tolerably well interspersed throughout the city. In Warsaw there is a particular quarter which is inhabited chiefly by the rich, and by the greater proportion of the inhabitants of that denomination. In Berlin, again, the two ranks are more intermingled. It has been stated by the daily press that in Vienna many persons in the middle and upper ranks have been seized, and even at an early period after the breaking out of the epidemic; but we have seen no trust-worthy or numerical statement on the subject. If the observation be true, it is easily understood, when we add that many persons of the middle and upper ranks inhabit the old city where the streets and houses are much crowded; and that their dwellings are the lower floors of houses, the upper floors of which are not unfrequently inhabited by the common people. These illustrations supply no feeble presumption of the existence of a general rule,—that the better ranks suffer chiefly in proportion to the degree in which their habitations are intermingled with those of the lower orders. And we are accordingly entitled to hope that the disease will prevail to a limited extent among the better ranks in the great towns of this country, as their dwelling-houses are for the most part in distinct quarters.

It is a striking fact, which the accurate statistical returns of Berlin and Moscow agree in establishing, that although the risk of seizure is less in the better stations, the mortality is at least as great. Statements to the contrary have been made by various authors, and are usually considered to be well grounded. But certainly both Moscow and Berlin can tell a different tale. In Moscow the mortality among the poor down to the 20th of January last, when 8524* in the whole population had been affected, was 47 per cent. in private hospitals and charities, and 53.2 per cent. in the temporary hospitals; but in private houses, where the better ranks chiefly were treated, the mortality was so high as 66 per cent. In Berlin of 99 cases among the upper ranks in the first half of the epidemic, to which period alone the public documents we have hitherto seen extend, the deaths were 66; while among the classes of artizans, watermen, day-labourers, hospital-nurses, and the like, the seizures were 558 and the deaths 373; so that in both classes of society the mortality was two-thirds of the whole. Hence in Berlin the mortality was quite as great among the rich as among the poor in the proportion of persons attacked, while in Moscow it was considerably greater. These remarkable facts, which are akin to what has been observed of other epidemic diseases, are not very easy of explanation. It is not impossible, however, that they are partly owing to the lower orders being treated chiefly in hospitals, which was notoriously the case at Moscow; for in epidemics the attendance in hospitals is more prompt, and the medical officers on the whole more experienced than in private practice.

7. Among the circumstances which influence the prevalence and mortality of epidemic cholera, age and sex have been observed to exercise frequently an extensive influence. Few accurate statis-

---

* This number, which we procure by calculation from the tables, differs from the summation there given, but only by a small proportion. The difference we cannot account for.

tical documents, however, have yet been published, which will enable us to ascertain their exact influence in malignant cholera. The only complete document, indeed, on the subject, is that given by *Dr Lichtenstädt* from the Moscow tables; which, however, only show the influence of sex. By calculations from tables giving the number attacked down to the 20th of last January in the private houses of the twenty districts into which Moscow was divided—in twenty temporary district hospitals,—in eight public hospitals and other institutions, and among the military, the following tabular view may be procured.

	Attacked.		Died.	
	Males.	Females.	Males.	Females.
Private Houses,	829	686	561	457
Temporary Hospitals,	2474	2055	1290	1124
Public Institutions,	803	696	374	332
Total,	4106	3437	2225	1913
Military,	840	141	386	81*

The military are stated apart from the general inhabitants, as the female population in a military body is disproportionately small. By calculation from these data it will be found, that for every 100 males attacked among the three first denominations of inhabitants, there were 85 females treated at home in private houses, 83.1 in the temporary hospitals, and 86.7 in the public institutions—being proportions not materially different in the different classes of inhabitants,—and giving a proportion in the whole population of 100 males to 83.7 females. Hence there is obviously a considerable immunity enjoyed by the female sex beyond what is possessed by males; for we presume, that in Moscow, as in other great towns, the proportion of female inhabitants is at least equal to that of the male population. The difference in favour of the female sex in some parts of India is much more remarkable. In the native inhabitants in the suburbs of Calcutta, the males attacked were to the females as four to one, while in Dacca and at Meerut the proportion was two to one. There is, however, a singular uniformity in the mortality in either sex at Moscow. In private houses the mortality was 67.7 per cent. of the attacks for males, 66.6 for females; in the temporary hospitals 52.1 males, 54.7 females; in the public institutions 46.6 males, 47.7 females; in the whole three classes collectively 54.2 per cent. for males, and 55.7 per cent. for females. The difference between the two sexes in mortality from cholera is therefore extremely trivial, and the little which does appear to exist is in favour of the male sex. This fact does not hold of other epidemics, for example of continued fever, by which the proportion of males usually carried off is a good deal greater than that of females. Is the universal conviction of the baneful effects of intemperance relatively to the mortality from cholera not well-founded? or by what cause is this prejudicial circumstance in the case of men compensated for in the instance of women.

---

* From these data it appears the total seizures and deaths were 8524 and 4605, while, as summed up in the original tables, they are stated at 8431 and 4588.

The only precise information we have hitherto seen on the influence of age is contained in a table of the mortality at different ages in one of the Moscow hospitals; and the facts are unimportant, as they are deduced from a limited number of patients, in all 405. Of this number there were under fifteen years of age 13 recoveries and 10 deaths; between fifteen and thirty-five 128 recoveries and 51 deaths; between thirty-five and forty-five 45 recoveries and 44 deaths; between forty-five and fifty-five 20 recoveries and 35 deaths; and above fifty-five 13 recoveries and 46 deaths. It appears then, that both childhood and an age beyond the middle term of life are unfavourable circumstances. The superiority of adolescence is remarkable; for between the ages of 15 and 25 the deaths were only 17 out of 88, or about a fifth. The same observation applies to epidemic fever.—On the present topic, Dr Orton has remarked, that the degree of susceptibility " is pretty constantly in the direct ratio with the age of the individual. Thus it has been constantly remarked, that infants at the breast are scarcely ever attacked, children rarely, and young adults in the first vigour of life are certainly much less subject than the middle-aged, though scarcely past their prime. The old are *cæteris paribus* by far the most subject of all," p. 454. We suspect, however, that these statements are founded rather on vague belief than on statistical facts. The Moscow table just quoted would show that the period of adolescence is sufficiently susceptible of cholera, although it runs less risk from it; and the extreme susceptibility supposed by Dr Orton to subsist among old people, is probably rather a deduction from the high relative mortality at that age, than from numerical observation.

In the last notice taken in this Journal of the question which at present divides the medical world,—in what mode the malignant cholera is propagated,—we stated as our opinion, that it undoubtedly arises spontaneously from obscure, unascertained causes; but that the contagionists had made out a good case in favour of its also possessing the power in certain unknown circumstances of passing by communication from man to man. To this opinion we are still inclined to adhere, with the addition, that the new facts which have been forced on the attention of the public, leave us now no room whatever for doubting that the disease does become in some circumstances communicable.

In approaching this subject we must admit that the inquiries of a cautious searcher after truth are surrounded in many quarters with serious difficulties, and that every man accustomed to judge of the relative value and trustworthiness of evidence, will be inclined to the opinion, that not a few of the facts, by which the controversy as to the contagious or infectious nature of cholera is to be decided, are undeserving of confidence. These impressions must have forcibly suggested themselves to every person of common sense, since the occurrences which took place at the breaking out of the epidemic at Sunderland. There for a long time we hesitate not to say that truth was quite unattainable; and we believe few will doubt this who may take the trouble to read the narrative on the Sunderland cholera in our Medical Intelligence. Under the impulse of strong private interest, falsehood was propagated with such zeal in every quarter, that the daily press was almost universally imposed on, and, ignorantly we hope, did its utmost to deceive the public and lull the watchfulness of government. When it is thus seen, how difficult it is to arrive at a knowledge of the truth in our own enlightened land, in a commercial city full of intelligence, and in a situation where every man's actions and opinions are made the object of constant observation and public comment all over the country,—it may very naturally be asked what reliance can be placed on facts collected in continental countries, in circumstances even more favourable to the perversion of truth, where private interest must engender even stronger prejudices, and where public opinion has comparatively no counteracting influence, because it has no outlet for expressing itself. Accordingly let us look for a moment to the case of Astrachan, the fatal spot where malignant cholera first obtained a footing, previously to its rapid dissemination over a great part of Europe. When this port was visited by the epidemic in 1823, it was universally alleged by the inhabitants that no trace of its importation could be detected; and the local Board adopted this opinion. But subsequently, on the appointment at St Petersburg of a committee, who were despatched to Astrachan to make all necessary inquiries into the circumstances attending the origin of the disease, it was discovered by the diligence of *Dr Rehmann*, President of the Board, who personally examined all the ship-lists, that among thirty-four vessels which had arrived at Astrachan from the shores of the Caspian during three months before the commencement of the epidemic, there were several whose crews had landed at ports where the disease prevailed at the moment; and that on board one of them eight of the crew died of the cholera. On the second visitation in 1830, the local Board of Astrachan, consisting entirely of medical men, fell into errors even more disgraceful, and gave utterance to so many false statements, that it is scarcely possible to acquit them of a willingness to deceive. In a report delivered to the governor-general of Moscow on the 11th of last February, when the disease had ceased for some months, and they had ample opportunity, one would think, to execute dispassionately the task imposed on them, they lay down among other propositions the four following:

> "The disease appeared first on board the brig Baku, 100 wersts (66 miles) from Astrachan. This vessel came from the island of Sara, which was healthy; and besides quarantine was in force at the landing place. Consequently the disease has arisen independently of infection; and has propagated itself to Astrachan in defiance of quarantine, and therefore as a non-infectious disorder."—"Medical men were not attacked, although they very often came in contact with patients, their clothes, their blood, and their evacuations."—"The personal attendants too of the sick continued healthy in spite of frequent contact; and if many of them did fall sick, this arose in consequence of the same miasmatic, non-infectious influence, through means of which other persons were attacked without having been in communication with the sick."—"In the year 1823, when the cholera prevailed at Astrachan, no precautionary measures were taken, and yet the disease did not pass onward into Russia."—*Lichtenstädt*, pp. 213, 214, 216.

But what was the true state of matters on all these important heads? The brig Baku had communication with the Caspian port of the same name, which is near the island of Sara, and where the cholera prevailed at the time. Instead of the physicians remaining unaffected, Dr Solomon, the only medical man in the place who did not give in to the opinions of his brethren, distinctly says that three were attacked by the epidemic in its characteristic form. As to the personal attendants on the sick, the same authority reports that "very many of the hospital attendants died, few of them escaped an attack, and of the female attendants not one,"—in short, that in persons of this denomination the disease prevailed to a much greater extent than throughout the general population. Lastly, as to the alleged limitation of the epidemic in 1823 to Astrachan, notwithstanding freedom of intercourse with the adjoining country, *Dr Rehmann*, President of the St Petersburgh Board, gives his assurance that the local authorities of Astrachan, disregarding the opinion of the medical board, absolutely drew a cordon of troops round the town.

It will be apparent, then, how much caution must be observed in relying on the facts which are the ground-work of the inquiry into the mode of origin and progress of this disease. It will likewise, however, be apparent on consideration, that it is the facts of the anticontagionists, much more than those of the contagionists which are subject to falsification,—at least so far as falsification may arise from its most common cause, private interest on the part of the witnesses who supply them.

With these prefatory words of warning to those who might plunge heedlessly into the present question, we shall proceed to state the reasons which, in our opinion, leave no doubt that, in some circumstances not yet accurately ascertained, the malignant cholera spreads by communication from man to man.

1. The first argument in favour of the contagious nature of cholera, but one which lies so much on the surface, and has been so often urged on the public, that any commentary on it would be superfluous, is the circumstances of its progress from India over the whole eastern hemisphere of the globe. In the course of fourteen years it has advanced eastward to China, southwards to Ceylon, northwards to Archangel, westwards to Britain,—raging at all seasons of the year,—in all terrestrial temperatures, from the highest tropical heat to the lowest arctic cold,—in all states of the air as to humidity, barometric pressure, or wind,—at sea and on land,—on all soils, from the most moist to the driest, from the most barren to the most fertile,—at all elevations, from the level of the sea to the highest inhabited region,—among all races of mankind whose country has hitherto come in the way of its march,—in all varieties of political condition, or civil station,—in short, in every variety of circumstance in which it is possible to regard human beings. Is there any disease of acknowledged miasmatic origin, to which the same observation can be applied? Is there any other mode of explaining why malignant cholera seems as it were to seek man out wherever he congregates, except by admitting that he carries it with him from congregation to congregation?

Again in this progress it is seen advancing from country to country, not according to any peculiarity of soil, climate, or weather, but simply according to the great routes of commercial communication. In Persia it appeared first in 1821,—not on the land frontier towards the east, where the sandy deserts of Baloochistan and Kaubul establish a difficult barrier to communication with the northern parts of India,—but at the three principal ports of the kingdom, Muscat, Busheer, and Bussora. From the southern frontiers of Persia it is traced in two streams, one up the Tigris to Bagdad, and thence along the caravan route to Aleppo and the Mediterranean, the other from Busheer through the central roads of the Persian empire to Tabreez, Reschd, Baku, and other cities on or near the Caspian. In

Russia it first appeared at Astrachan, the port on the Caspian, between which and the infected districts of Persia commercial intercourse is carried on to the greatest extent; then in 1829 it broke out first in Orenburg on the extreme eastern frontier, the first resting-place in the Russian empire for the eastern caravans on their way westward; again in 1830 it burst with fury a second time on Astrachan; and from this point it quickly spread along the Wolga, the great channel of communication between the south-eastern frontiers and the heart of the Russian empire. While following the course of this river to its source, it at the same time struck at one point across the country of the Don Cossacks along one of the great highways; and subsequently established another lateral line of march where the great road from Moscow crosses the country to meet the Wolga. Once in the heart of the Russian empire it soon spread as from a centre in all directions,—making its first long stride westward into Poland, between which and the central parts of Russia an unusual degree of intercourse was maintained by the march of the levies for the Polish war. The moment it touched the Baltic at Riga, we find it no longer creeping from place to place as in its progress through inland parts, but springing quickly from one great port to another, leaving the intermediate places of small commercial resort at first untouched, and likewise passing slowly and to but a short distance inland at each point successively visited. At length clearing at its next step about 500 miles of sea, it appears first in Britain, which of all the remaining European countries has the most direct and most frequent communication with the Baltic; and the first place at which it appears, as in all other instances where it has attacked a sea-bound country, is a great sea port, in constant communication with cities where the disorder prevailed.

If, quitting these great features in its mode of advancement, we endeavour to trace it minutely as it spreads over a limited district, the same general law will be found to govern its march. Constantly it has spread along the highways, frequently has accompanied the migrations of bodies of men, such as the movements of troops in India, Persia, Russia, and Poland, or the progress of the caravans and pilgrimages.

Farther, in its progress it has not only followed the great lines of commercial intercourse between country and country; but likewise has advanced along those lines with a rapidity proportioned to the facility and swiftness of communication. It took nearly a year to cross the peninsula of India from Calcutta to Bombay, and in another inland direction to ascend the Jumna to Delhi and Meerut. After its appearance on the southern frontiers of Persia, two years elapse before it appeared at its northern frontiers towards Russia. But after its arrival in Russia, its progress along the frequented highways of that empire, and among the busy ports of the Baltic, has been comparatively far more rapid. In the same space of time which the epidemic took to travel a thousand miles in India, it has cleared nearly thrice the distance since its arrival in Europe. A very striking fact which may properly come under this head, is, that when the interval to be cleared has been sea alone, the distance which it has sometimes appeared to overleap in a short space of time has been sometimes inconceivably greater than has ever been remarked on land. The infected ports on the continent which are nearest Sunderland are at least 500 miles distant; the Mauritius to which the disease appeared to pass in a few weeks from Ceylon or the Indian Peninsula, is two thousand leagues from the nearest ports of Hindostan.

But still further, wherever in its progress the freedom of intercourse has been for a time interrupted, its march in like manner has been for a time arrested, or even stopped altogether. In 1823 the enforcement of quarantine by Sanitary Lines of troops confined the disease to Astrachan and extinguished it; in 1829 and beginning of 1830 the Orenburg epidemic advanced westward at many points close to the Sanitary Lines then established, but nowhere pierced them, and was thus in fact a second time extinguished; in 1818 and 1819 the north-west stream from Calcutta, along the Jumna, and onwards towards Kaubul, seems to have gradually lost itself in the sandy deserts, at least for many years did not reach the cultivated regions of Orenburg; in 1819, after ravaging the Mauritius, where no quarantine was established, and slipping into the adjoining Isle of Bourbon in defiance of quarantine, it was confined in the latter place by Sanitary Lines to one spot, and extinguished; and during the frosts of last winter, while the disease, notwithstanding the cold, continued to rage in various large towns of Russia, its further progress was nevertheless arrested, or at least most materially retarded, till spring returned and restored the facility of communication throughout the country. It is true that in very many instances the strictest possible internal quarantine could not succeed in excluding it. That such should be the result of attempts at land quarantine by Sanitary Lines in the populous parts of Europe, accustomed to the utmost degree of daily intercourse, cannot appear surprising. To look for the rigorous enforcement of quarantine in such circumstances, has certainly always appeared to us a very vain and weak expectation. And accordingly, in Russia, Austria, and Prussia, where an unlimited command of troops, and the despotic nature of the governments, present great advantages for the establishment of internal quarantine, the Sanitary Lines have been every where overstepped by the disease again and again, after it had reached the more civilized parts of Europe. At the same time it is worthy of remark, that in most places where a rigorous quarantine was enforced,—such as between Moscow and St Petersburg, between the Polish territories and the confines of Prussia, the Russian territories and the confines of Hungary, and latterly between the Baltic and Great Britain,—the disease was for a time kept in check, and its dissemination, where it did pierce the quarantine lines, appeared less wide and rapid than in other places where, from the absence of a sufficient quarantine, there was a probability of its passing, not by one or two, but by many points of communication at one and the same time.

On taking a general view of all these circumstances which have marked the progress of malignant cholera over the globe, it will certainly appear impossible to account for its mode of advancement, on the principle of its originating alone in miasma, atmospheric peculiarities, or terrestrial changes of any kind, while, on the contrary, every circumstance corresponds exactly with the idea of its having sometimes its origin in infection; and if many events in its progress appear at first sight at variance with the facts we have advanced, and with the doctrine of contagion, we may, without the risk of being accused of advancing captious arguments on the subject, reply to such objections in one of three ways. For first, it has been abundantly shown by recent incidents, that, on the one hand, communication often exists freely where it is little suspected, and, on the other, that in some circumstances slight causes will interrupt communication sufficiently to exclude the disease. Secondly, in every great town more or less, but above all in every great sea-port, the inhabitants have an obvious interest to pervert facts which tend to support the doctrine of infection, and consequently their evidence cannot be relied on when it goes to establish the opposite doctrine. And thirdly, we admit that there are many facts, so far as can be seen, free from fallacy, which prove that malignant cholera may arise from some other cause besides communication with the sick; and that all we contend for is, that after it has in one way or another arisen, it may in some peculiar circumstances propagate itself from man to man.

2. The second argument in favour of the infectiousness of cholera is, that in a great majority of instances where it has broken out in new territories remote from its previous seat,—at least since it has arrived in civilized countries, in which alone we can rely on the attention of the inhabitants being alive to

approaching events, and capable of making the requisite observations with accuracy,—it has been found to succeed, after a short interval, the arrival of persons from places where the disease prevailed.—At Mauritius, removed by an immense space from the nearest abode of the epidemic at the time, it broke out three weeks after the arrival at Port Louis of a king's ship from Trincomalee in Ceylon, where the crew had suffered from the disease. The anticontagionists have denied this fact; but the recent publication of an extract from the journal of the surgeon of the vessel, written at the time the event occurred, leaves, in our opinion, no room for questioning the authenticity of the original statement. According to this extract, while his Majesty's ship Topaze lay at Trincomalee, two of the crew died of malignant cholera on the 16th and 20th of September 1819, others also being attacked, who recovered; on the 9th October the vessel set sail, carrying all her sick but one; immediately afterwards the cholera broke out, attacked seventeen persons, and proved fatal to four; on the 29th of the same month the ship reached Mauritius, when thirty of the sick were immediately landed, and put under the care of the military surgeons of the place; here several died, four in consequence of the sequelæ of cholera; and three weeks after they were landed the disease appeared among the inhabitants.—[Med. Gazette, November 19, 1831.]—In 1823 a similar leap was taken over an uninfected space of several hundred miles from the southern shore of the Caspian to Astrachan; and here, too, the epidemic followed the arrival of vessels from ports where the disease was raging. By the examination of the ship-lists, it appeared that, between the 1st July and end of September, thirty-four vessels arrived at Astrachan, several of which had in their voyage touched at Lenkoran, Sallian, and Baku, where the cholera prevailed, and that one of them, the St Andrew, lost eight of her crew from the disease. It was subsequently to the arrival of this vessel that the disease broke out in the town; but the interval is not mentioned in any document which has come under our notice. [Lichtenstädt, 133.]—Again, in 1830, the very same stride was taken, and under precisely the same circumstances. The ship Baku from the Island of Sara touched during its voyage at the Persian port of Baku, where cholera prevailed; after its arrival in quarantine, the disease appeared on board, and the patients were treated in a lazaretto adjoining the anchorage; and about three weeks subsequently cases began to appear among the inhabitants of the town. The first appearance of the disease at St Petersburg was marked by circumstances of an analogous nature. The first five cases occurred on the 26th of June, in persons who either had just arrived from infected towns at some distance in the interior on the banks of the Wolga, or resided close to the quays where the barks from the same towns performed quarantine on their arrival at the capital; and it is added, that the quarantine rules as to the purification of goods were both very insufficient, and enforced in a very careless manner,[Government Papers, 24.]—Of the same nature are the circumstances which attended its production at Cronstadt. On the 30th June a boat arrived with a cargo of oats from one of the barks at St Petersburg, which lay at the quay where the disease had appeared a few days before; and one of the crew was landed from the boat at the Cronstadt lazaretto with cholera, of which he died in twenty hours. The third and fourth cases were two custom-house soldiers who had been on duty at the bastion where the sick man was landed, and where also lay many barks and other vessels from the capital. For some days almost all the cases of cholera in the town came from the neighbourhood of this bastion. The second and fifth cases were a timber-merchant and a sailor of a hemp lighter, both of whom had been among the barks at the suspected district of St Petersburg, and brought cargoes from them.—Lastly, it may with much reason be affirmed, that the epidemic has made its first appearance in Britain under circumstances not materially different. It broke out first in a seaport where the quarantine station was so preposterously situated, that suspected vessels had to work their way to it through the shipping in the harbour, and where the quarantine restrictions are said to have been notoriously disregarded; and in this place it made its first appearance close to the quay. It is true that, so far as we can understand, no trace has been hitherto detected of its passage from any suspected vessel to the individuals who were the first victims. But this will by no means entitle any one to deny that such communication was probable; for, as will be seen by an article in our Medical Intelligence on the Sunderland cholera, instances have occurred in that very town some months before of malignant cholera in persons recently arrived from Russia, which were not taken notice of at the time, and have only been discovered very lately since the disease began to prevail extensively.—We might easily extend these illustrations to an indefinite length, but enough, we apprehend, has been said to show that in many places to which cholera has passed by a long stride, it appeared either immediately after the arrival and illness of persons from infected parts, or at all events in circumstances where the recent arrival of such persons was very strongly and reasonably suspected.

But it is not only in its passage from one country or large district to another that this rule has appeared to have been very generally observed. The same law has apparently governed its progress throughout the minor steps of its progress throughout more limited districts. Of this fact we have already given a sufficient number of illustrations in the analysis of the former Russian Reports of Dr Lichtenstädt, (xxxvi. 130.)

3. The third description of proof of the occasionally contagious origin of cholera is, that where a rigorous quarantine was observed in particular small districts, it was frequently excluded, though raging all around the secluded spot; or on the other hand, it was pent up in particular spots, and prevented from spreading to the neighbourhood.

In addition to the facts of the former kind mentioned in our analysis of Lichtenstädt's first reports, the following are worthy of special notice. During the Persian epidemic, the capital of that country was apparently saved on one occasion from a visit of the epidemic, by an edict obliging the caravan from Schiraz to shun the city, and proceed by the highway of Jesd. The disease did not appear in the capital, but broke out in other towns on the caravan route, (*Lichtenstädt*, 135.)—In Cronstadt, where the ravages of the epidemic were excessive, 2262 having been attacked, and 1139 carried off by it, in a population of 20,000, the school of cadets consisting of 150 pupils was kept free all the time. Two days after the first cases appeared in the town, the school was shut up, and the strictest quarantine maintained till the epidemic was at an end. Among the pupils no case of the disease occurred; and there were only one or two among the servants who were obliged to go beyond the quarantine bounds (*Government Papers*, 52).—In 1822, when the cholera was approaching Aleppo, the French consul, with a party of 200 people, left the city and shut himself up in a garden in the vicinity, which was surrounded by a rampart and ditch, and where he enforced rigorous quarantine. Here not a single instance of the disease occurred, while in eighteen days 4000 persons were swept off in the town.—When the epidemic was fairly established in the Russian capital, the quarantine restrictions were generally removed; but a strong double cordon of troops was still maintained around Zarcozelo and Peterhoff, to which the court and nobility, with their attendants, in all 10,000 persons, retired and resided in strict seclusion. In the beginning of October the restrictions were withdrawn; and it was accurately ascertained that not a single instance of the disease had occurred within the enclosure, though it raged in all quarters around in the close vicinity of the Lines (*Government Papers*, 58).—A government correspondent at Alexandria, where the epidemic broke out last August with such virulence as to sweep off 988 persons in seven days out of a population of 50,000, states that, at the time he wrote, thirteen days after the disease appeared, not one European of those who were properly shut up in their houses, as in time of plague, fell a victim to the disorder (*Ibidem*, 68).—In many instances, even in India, where no pains whatever were taken to exclude the disease, the last parts of the towns which suffered were the prisons, and not unfrequently they escaped altogether. Thus the jails of Cannanore, Calicut, and Madura, were not attacked for a month and more after being completely surrounded by the epidemic; and in similar circumstances, the jails of Bellary containing 500 prisoners, the great jail of Alypoor containing several thousands, the jail of the Court of requests at the same place where there were 400 people, the jail at Poornea, that of Furruckabad inhabited by 600 or 700 persons, and likewise the jail at Burruckpore, entirely escaped, (*Orton*, 339.)

Among the instances mentioned by our authors of the converse circumstance,—the limitation of the disease to a small spot apparently from strict seclusion of the inhabitants, the following remarkable incidents are worthy of mention.—A division of prisoners for Siberia arrived on the 17th October at Perm from Kasan, about 230 miles distant, where the cholera raged at the time of their departure. On the road they had no communication with the inhabitants, strict confinement and seclusion being everywhere observed till they arrived at Perm. Here they remained in the prison for two days, and on their quitting the town for Siberia left twelve sick persons behind them, none, however, at that time affected with cholera. Four days after their departure the cholera suddenly attacked three persons in the hospital, one an hospital attendant, the two others prisoners in the place before the arrival of the people from Kasan; and in six days it seized altogether seventeen persons, of whom fourteen died. Four of the seventeen were healthy at the time, two of them privates in the corps of watchmen, one the hospital servant, and the fourth a prisoner. The disease did not spread to the vicinity; neither did it appear among the prisoners forwarded towards Siberia, (*Lichtenstädt*, 109.)—In the government of Pensa the following incident was ascertained by Rehmann of St Petersburg, a physician whose name is often mentioned both by Lichtenstädt and by Drs Russell and Barry with the greatest respect, and who, unhappily for the interests of medical science, fell a victim to his zeal towards the close of the epidemic in the Russian capital. A man arrived in the village of the government of Penza, after having paid a visit to a place twenty-four miles off, where the epidemic prevailed, and where his son had died of it. A few days subsequently to his return he was seized with cholera and died; three women who attended him and washed his body after death were next seized and also died; and the epidemic then spread through the village. A medical man, however, having arrived while the fourth patient was ill, and finding that a particular part of the village contained all the infected persons, "he barricaded the common street where the disease had not reached, and interdicted all communication to the two sides of the village, even for the purpose of going to church. In that side in which the disease first broke out upwards of 100 cases of cholera occurred, but the disease did not appear on the other side of the barricade." (*Government Papers*, p. 42.)

4. The fourth argument in favour of the infectious nature of cholera is, that it spreads most rapidly in the densest bodies of men. Nowhere has it affected all the susceptible persons in a body of men so quickly as when they were accumulated in a small space. In a regiment or army, or in a body of pilgrims a very few weeks have sufficed to carry it among all the susceptible individuals; and in a ship's crew the rapidity of its dissemination has usually been even greater still. In great towns, on the other hand, where large bodies of men live together, but not in such close proximity, its diffusion has been proportionally much slower, and in the largest towns, such as Moscow and St Petersburg, it has taken between three and six months to affect all the susceptible population. In country districts again its progress has been still slower; and even in villages of a few hundred inhabitants five or six weeks or more have often elapsed before every susceptible person was attacked. On the principle that infection is a great means of propagation, all these facts are easily explained; but without admitting infection as a cause, they are incomprehensible.

5. We might add many other arguments to those already adduced, but will rest satisfied with one more, to which it seems scarcely possible to find a rational objection. This is, that the disease has in general prevailed to a degree proportionally greater in persons whose employment brought them much in contact with the sick, than in the general population of the same rank in society.—First, as to hospital servants and nurses, even in India several striking instances occurred of the propagation of the cholera among the personal attendants of the sick; in Europe, such incidents have been of frequent occurrence; and if many instances have also happened where the attendants in hospitals did not suffer, all we shall say is, that although this must appear very mysterious and inexplicable to an unqualified believer in contagion, there is no apparent mystery to us who are willing to admit that the cholera becomes contagious only in certain unascertained circumstances, while in other circumstances its infectious disposition is veiled or altogether absent. But, not only the personal attendants of the sick have been found in many

places to suffer in a disproportionate degree to other individuals of their station in society,—it has likewise been repeatedly found that physicians have suffered to a much greater extent than other individuals belonging to the middle ranks. Various facts of this purport will be found scattered throughout the works now under consideration. We shall be content, however, with quoting one only, the strongest of all, which is supplied by Drs Russell and Barry in the Government Reports. In St Petersburg, the number of persons attacked down to the 10th of November was about a 45th part of the population, and the deaths an 87th; and probably the proportion of persons in the middle ranks was somewhat less. But among the medical men employed in the treatment of the disease, amounting in all to 264, twenty-five were attacked, and nine had died up to the 27th July; and the last sentence in the Report is an extract from a letter of Dr Barry, dated the 8th October, and announcing the death of Dr Rehmann, the eighteenth medical victim of the epidemic. Hence the proportion of deaths among medical men was above a fifteenth of the whole, or six times the proportion among the inhabitants generally.—The clergy likewise have suffered in some parts of Russia to an extraordinary degree; and no reason can be discovered for this, except that their office leads them to be much in contact with the sick, since few persons are allowed to die in that empire without a visit from a priest. In Moscow forty-two clergymen died, which is certainly an enormous proportion, even making every allowance for the great number of persons of that profession who inhabit the ancient capital of Russia.

By means of the preceding facts and arguments, which have been selected from a great body of documentary evidence of a similar nature to be found in the recent writers on cholera, we have been led to the opinion, that the malignant cholera is in some circumstances communicated by the sick to the healthy. And we suspect there are few dispassionate persons, accustomed to weigh evidence, who will not allow that the proof of such communication sometimes occurring, is as complete as it would be reasonable to expect in any question of the kind. Accordingly, if we may trust our own opportunities of knowing the sentiments of the profession, a vast majority of medical men in this country, and among these many who were formerly of a different way of thinking, are now convinced that the disease is infectious. The public perhaps may not suppose such to be the fact; for here, as in the instance of all other diseases which have given rise to a similar question, the anticontagionists make up by their activity and strength of language for the paucity of their numbers and weakness of their arguments, and thus contrive to persuade many that they speak the general opinion. But we are quite sure that we speak the sentiments of a very large proportion of the medical men of this place at least, when we say that the spasmodic cholera may undoubtedly be communicated by the sick to the healthy.

Whether the disease may be communicated in any more indirect way than by the approach of the healthy to those actually labouring under the disease is another question, which we scarcely think the documents before us will enable a calm and impartial person to decide. Some facts certainly warrant a strong suspicion, notwithstanding the declared opinion of various Russian boards to the contrary, that the disease may be communicated both by goods, and likewise by dead bodies. But all the incidents of the kind we have perused are stated so succinctly that no security can be got that those who describe them were aware at the time of the fallacies to which they were exposed in making their observations.

We might perhaps without impropriety dismiss the third head of the present sketch, the treatment of the disease, with a single remark,—namely, that since it has travelled from Astrachan to Moscow, Warsaw, Berlin, Hamburg, and Sunderland, no substantial abatement has been affected by any mode of treatment in the average mortality. This consideration will certainly influence us so far as to make it in our opinion quite unnecesssary to follow the authors of the works before us throughout the infinite varieties of treatment they have practised or described. But some observations are called for with the view of determining the question, "Whether the measures originally recommended in India continue still applicable to the epidemic after its passage into Europe?" The main articles of the treatment which a very large majority of British practitioners in the East Indies have united in recommending are blood-letting,—external warmth, with frictions,—the internal administration of opium, aromatics, ether, spirituous fluids, or essential oils, or several or all of these combined,—the application of sinapisms on the belly and legs,—and subsequently the exhibition of gentle laxatives and calomel. The chief new remedies which have been brought into notoriety during the progress of the disease through Russia, Prussia, Poland, and Germany, are emetics, solution of salt, magnesia, subnitrate of bismuth, oxygen gas, and some others; but all of these empirical remedies, although some of them were much vaunted and conscientiously believed at first to be useful, have proved quite inefficacious on more careful trial; and so far as we may judge from the numerous discrepant statements which have appeared in various quarters, the attention of practitioners, wherever the disease appears for the first time, insensibly reverts to the original British mode of treatment, which, whatever may be said of its success, is at all events obviously directed towards certain very obvious and important *indications of cure*.

From all we can learn of the experience of the Russian, Prussian, and Polish physicians, as well as from what has been observed at Sunderland, blood-letting continues to be depended on by most practitioners as a valuable remedy, wherever it is practicable to put it in execution. The general statement made on the subject by the authorities whose works are now before us is, that when resorted to early it invariably does good if the blood can be got to flow with tolerable freedom; and we have seen some letters from Sunderland, which state that a very great proportion of the patients who recovered were bled from the arm. The usual phenomena remarked in India, the gradual change of the blood from dark to florid, from tarry thickness to the healthy degree of fluidity, have been remarked likewise in the European disease.

External warmth, along with frictions, is considered an essential article of the treatment by all, but few agree as to the best method of applying it. Some prefer the warm-bath, others a vapour-bath, others a hot air-bath, others heat applied by means of solids, such as warm sand or salt, hot bricks, bottles of hot water, and the like; and each writer in commending the method he himself practised, condemns every other way of heating as bad. We apprehend the proper question is, what mode of applying heat is the most effectual, the most permanent, and the least fatiguing? In reply, it must be allowed that the warm-bath is ineligible on account of the fatigue it occasions, independently of the subsequent cooling during the drying of the body, as well as the impossibility of the cold skin enduring at once water of a sufficiently high temperature. Dry heat by means of warm solid bodies cannot easily be applied conveniently over a sufficiently large space, but appears to be very effectual. To the hot air-bath we confess we are partial, partly from the facility with which it may be employed without fatiguing the patient, partly from an experiment we have made with it on our own person. The bath adopted by the Edinburgh Board of Health is the hot-air bath of Mr G. Hamilton Bell, and consists of a semicylindrical frame of open wicker work, which is placed over the patient's body and under the bed-clothes, and which has a board at the foot perforated by a wide copper tube. This tube expands outwards and is bent downwards, so as to present a wide mouth over a large spirit-flame from alcohol in an open tin vessel. By means of this apparatus, which, as Mr Bell has constructed it, requires a consumption of sixpence worth of alcohol per hour, the temperature may be varied to

115° or 120° F. in ten minutes, and subsequently to 160° if desired. The only objection, but a material one, is that a long time elapses before the back can be heated. To obviate this all which appears necessary is to place the patient on a light truckle raised three or four inches above the mattrass, and supporting by loose cordage a single or double blanket,—so that the hot air may pass under as well as above the body. By such a contrivance we believe the body will be sooner heated, and more effectually, and with less fatigue, than in any other manner.

The use of opium in the form of laudanum or in the pure state, given both by the mouth, and if necessary by the rectum, appears obviously a proper article of treatment, and is still very generally followed. But the general opinion of those who employ it is, that many practitioners in the East gave it in too large doses, as Mr Bell has very pointedly affirmed in his late publication, reviewed in our last number. Some remark, that since the chief danger does not by any means lie in the mere vomiting and purging, which in the eyes of many are but subsidiary and not essential symptoms, the importance of opium, which does no more than check such symptoms, has been overrated. But we repeat, that the experience of the majority is decidedly favourable to the moderate use of opium.

Spirits, aromatics, ethers, and essential oils, come under the denomination of diffusible stimulants, and are intended to rouse the languishing circulation. They are much confided in by many, entirely by some, and are more or less used by all. It is impossible to say which is best. Enormous prices have been paid of late for cajeput oil, in consequence of Sir M. Tierney puffing it, and Sir H. Halford thrusting it among the farrago of remedies recommended by the first General Board of Health. But we suppose any other essential oil will serve the same purpose. On the whole, if diffusible stimulants are useful, probably nothing better can be found than the mixture of ether and aromatics with which the Edinburgh Board recommend the laudanum to be administered, as may be seen in our Medical Intelligence.

The application of sinapisms to the belly and legs, and the constant vigorous employment of friction are insisted on by almost all as important auxiliaries to external heat, and are obvious in their mode of action.

As to the administration of calomel and laxatives in the subsequent treatment, after the first danger from the stage of collapse has been averted, we can only say that most of our authors recommend them, but that we have not seen any satisfactory account of their effects or evidence of their utility, while at the same time we have no doubt those who mention their beneficial influence, speak from actual observation, and are probably warranted in what they say. It is rather remarkable that no notice is any where taken, so far as we can find, of the treatment of the typhoid fever, which, since the malignant cholera arrived in Europe, is represented to be a common sequela of the proper choleric symptoms.

With these observations we must hastily conclude a sketch, already too much protracted, yet presenting we fear but a faint idea of the great mass of interesting and precise information contained in the works whose substance it has been our aim to embody. The plan of giving an analysis of these works, which, as an act of justice to authors, it is always our desire, and generally our practice, to adopt, was in the present circumstances quite out of the question. But in the sketch we have drawn free use has been made of the knowledge communicated, and sufficient reference has been made throughout to the particular works, to enable the reader to discover where he will find more detailed information of the kind he may want. We shall here then only add, that, among the works now professedly reviewed, those which appear to us the most valuable are the Reports of Dr Lichtenstädt, the Reports of our Government, the Treatise of M. Brierre de Boismont, and, above all, the work of Dr Orton, which stands among the foremost of all those hitherto written on Malignant Cholera.

ART. IV.—*Illustrations of Surgical Anatomy, with Explanatory References, founded on the Work of M. Blandin.* By JOHN G. M. BURT, Surgeon to the City Dispensary, Extraordinary Member of the Royal Medical Society, &c. Edinburgh, 1831. 4to.

ON a former occasion we introduced to the notice of our readers, in terms of deserved commendation, the treatise of M. Blandin on Surgical Anatomy. That work, it was then mentioned, was accompanied with twelve lithographic engravings, illustrating some of the most complicated and important points of surgical anatomy. Though the literary stock of the country possesses now many engraved representations of regions interesting to the surgeon, in different treatises, such as those of Sir A. Cooper on *hernia*, Mr Hodgson on aneurism, Mr A. Burns on the parts constituting the head and neck, and numerous figures of the parts concerned in lithotomy, it is well known that we *possess* no individual treatise embodying, for the use of the student, all these points of surgical anatomy which it is either difficult for him to understand, or important to remember in the performance of surgical operations. With the view of supplying this deficiency, Mr Burt has undertaken to republish the engravings of M. Blandin, with such additions and modifications as may render them a useful guide to the English practical surgeon.

The work consists of eight numbers, each containing two engravings, so that the publication of Mr Burt contains altogether sixteen engravings, or four more than the original of M. Blandin. The principal difference between those of the original and the present copies are, that while the former are lithographic, the latter are engraved, and that the publisher has enlarged and rectified the work by the addition of several new plates.

The first circumstance gives the present plates the advantage of a much clearer outline, and a sharper and altogether finer effect as pictorial objects, while the fainter and more delicate parts are less liable to be lost in the operation of printing. By means of the second, Mr Burt is enabled to render the work of M. Blandin more complete and useful to the English student than it would otherwise be.

We are happy to say, that, as engravings, these plates are of the first quality, and are certainly the best specimens of art which have yet been given to the student in this country. They are remarkable for being accurate copies of the original, and for giving very distinct and correct views of the relative situations of the important parts concerned in the great operations. In arrangement, also, the present publication differs somewhat from the original.

The two first plates, devoted to the illustration of the superficial and deep anatomy of the neck and throat, give very distinct views of the superficial lymphatics and glands, the relations of the subclavian artery to the *scaleni* muscles, the external jugular vein, and the different cervical nerves, the carotid artery and its laryngeal and thyroid branches, the pneumogastric nerve, hypoglossal, recurrent, and cardiac nerves. These plates correspond to the fourth and fifth of M. Blandin.

The second number contains two engravings,—the third devoted to the relative anatomy of the cavities of the nose, mouth, larynx, and pharynx, and the fourth to the illustration of the parts concerned in operations on the eye. Both engravings are additions to the original of M. Blandin; but as they are not original in the present work, it would have been proper in the Editor to mention whence they are borrowed, as those who are unaware of the fact, may be led to give him credit to which he is scarcely entitled. The former exhibits a vertical section of the cranium and the soft parts of the head and face, exposing the frontal and ethmoidal sinuses, the nose, and the communication between the nasal cavities and mouth, the oral membrane and palate, the tonsils, *uvula*, tongue and its muscles, the epiglottis, and sections of various parts of the larynx. This is copied, we must inform our readers, from the third engraving of the excellent figures of Mr John James Watt; and we cannot help thinking that Mr Burt ought to have acknowledged this in his letter-press or preface.

In the fourth plate we find seven figures illustrating the relative anatomy of the eye, all copied from the engravings of Mr Alexander Watson of this place, and which should also have been acknowledged. We have already expressed so favourable an opinion of the engravings of this gentleman, that it is quite unnecessary to repeat it on the present occasion. It is sufficient to remark, that the figures are very beautiful, and most valuable to the chirurgical student

The fifth plate, which is also additional to the work of M. Blandin, gives a front view of the arm-pit; and the sixth, which is the third of M. Blandin, gives an inferior view of the same region. Both figures are intended to illustrate the relative anatomy of the axillary and subclavian vessels.

The seventh and eighth plates, which are the second and first respectively of M. Blandin, exhibit the surgical anatomy of the bend of the arm and the fingers, with the digital arteries and the digital synovial sheaths.

The ninth and tenth, which are the sixth and seventh of M. Blandin, are devoted to the illustration of the parts concerned in inguinal and crural hernia. The first gives a very good view of the external or inferior apertures of the inguinal canal and crural arch, with the relative situation of the iliac artery and vein; and the second shows the internal or superior apertures of the inguinal canal and crural arch, and the connection of the perinæal aponeurosis with that which lines the pelvis.

The eleventh, which is the eighth of M. Blandin, gives a good lateral view of the pelvic viscera and their relative parts, with the pelvic aponeurosis. The twelfth contains three figures from Scarpa and Cooper; the two first showing the manner in which crural *hernia* is formed, and the third the anatomical relations of the most common form of inguinal *hernia*. These three figures are very successful imitations of the excellent originals.

The thirteenth, which gives a very excellent view of the perinæum in the male; and the fourteenth, which is a vertical section through the mesial plane of the pelvis, are copied from the ninth and tenth of M. Blandin, but have the advantage of being much finer and more delicate engravings.

The fifteenth and sixteenth are the eleventh and twelfth of M. Blandin. The former is a very excellent and successful view of the *perinæum* and *vulva* in the female, more delicately engraved than that of M. Blandin. Neither, however, are so good in our estimation as the same view of the parts by Mr Watt, though in the latter there is no dissection of the constituent parts. The sixteenth is a good view of the muscles, tendons, blood-vessels, lymphatics, and nerves found in the brain.

We cannot conclude this account of these engravings without recommending them to the particular attention of the student of surgical anatomy. They are, on the whole, well selected, and they are arranged in a much more judicious manner than in the original work, and reflect considerable credit on the editor. Mr Burt has further the merit of choosing an engraver who has done every justice to the work, and he has the undoubted merit of giving the first specimens of art in this way really deserving praise.

The main defect of the work is, that it is perhaps too limited, and gives on the whole too little of that species of local and relative anatomy which is indispensable to the surgeon. We admit that it is difficult to say what should be the exact limits of a work of this kind,—how much or how little it ought to contain,—and what selections should be made from the extensive and well cultivated field of surgical anatomy. There might notwithstanding have been reasons for admitting into the present work some more of the views of the nasal cavities, the mouth and pharynx given by Mr John James Watt, some more of the figures illustrative of the forms of hernia, and all those relating to the course and situation of the large arteries, which become the subject of operation. It might, for example, have been expedient to introduce more complete views of the subclavian, axillary, and brachial arteries; of the common and external iliac; of the superficial femoral; and the tibial and fibular arteries. In reference to the present work, particularly, we may remark, that though it is important to know the course and situation of the carotid and subclavian arteries, it is perhaps more frequently so to know those of the brachial. While there is a figure of the popliteal artery, which the good surgeon never even thinks of tying, there is none of the superficial femoral, which he may be called on to secure five or six times in a twelvemonth. There is indeed too great attention paid to extraordinary and singular operations, while those which are most common are too much neglected. But why should we indulge in these observations; when we know that no good surgeon would trust to engravings alone for his knowledge of parts to be divided or to be spared and pushed aside in operations.

PART III.

MEDICAL INTELLIGENCE.

On the Sunderland Cholera.—In the course of the summer and autumn, the minds of all ranks and all men throughout Britain being turned with intense anxiety to the progress of cholera along the Baltic shore, it was natural that various false alarms should arise in different quarters. Accordingly at Port-Glasgow, Leith, Hull, and Margate, the alarm was successively given, and sometimes so loudly that government found it necessary to despatch a physician acquainted practically with the disease, to inquire on the spot into the grounds of the rumours. In all the instances where an inquiry was made, and in the instance of Leith, where no inquiry took place, as the alarm was speedily subdued, but where we have had an opportunity of ascertaining the facts,—it has turned out that common cholera raged during the autumn to an unusual extent, that many cases presented features of unusual severity, and that an unwonted number proved fatal in the unusually short period of 36, 24, or even 18 hours, and less. It is worthy of particular remark that the same circumstance was observed at Sunderland; for Dr Orton, whose work appeared before the malignant disease broke out there, observes almost with a prophetic spirit, that he had "the authority of Dr Clanny for the most unusual prevalence and malignity of cholera at Sunderland during the autumn," and that "it is greatly to be feared that these are but the skirts of the approaching shower," (p. 469.) Even in Edinburgh diarrhœa has been unusually frequent, cholera too has certainly been more common during the last autumn than generally at that season, and some very severe cases have occurred to various practitioners. But neither in severity, nor in prevalence has the disease appeared here to the same degree as in other towns.

There is no doubt, then, that in many parts of Britain cholera has of late been unusual in violence and frequency. On inquiry at the ports where alarm arose as to the appearance of malignant cholera, it was believed to be fully ascertained, that the fatal cases which gave origin to the rumours were merely instances of common cholera. At the same time, in some of them there seems to have been a very extraordinary resemblance to the malignant or epidemic disease; and from what will presently be mentioned on the authority of Dr Gibson, one of the army medical officers sent by government to Sunderland, it is far from impossible that cases of true malignant cholera may have occurred without their nature having been at the time detected, as at least one apparently genuine case has been lately discovered to have occurred at Sunderland two months before the breaking out of the epidemic there.

Whatever truth may be in these statements, the first real alarm was not sounded in this country till the 26th October; and it is now, after a good deal of paper conflict and wordy violence, universally acknowledged that the alarm this time was not raised without sufficient reason. As at every other sea-port or other place on the confines of a country not previously attacked, so at Sunderland, no sooner did the disease appear, than the townsmen, supported, we are grieved to say, by a large body of the medical men of the town, raised a violent opposition to the idea that the new disorder was the malignant cholera, or that it was imported from abroad. On the occurrence of five suspicious cases in quick succession, several medical men who saw them, and among the rest at least one gentleman practically acquainted with the features of the disease in India, agreed that it was the malignant cholera, and reported to this effect to the Central Board of Health. The port being immediately put under quarantine as respected navigation, the coal-owners, coal-merchants, and other traders naturally declared aloud that the medical reporters had formed a rash, ignorant, and erroneous judgment; protested that the disease, *which had carried off its five first victims in rapid succession*, was nothing more than a severe cholera, such as had prevailed in the town for some time before; denied that it could have been by any chance imported, and,—what the members of the medical profession throughout the country, whose feelings and private interests were not concerned in the matter, will now we dare say scarcely believe,—so far influenced the sentiments of the practitioners throughout the place, that a committee of eighteen physicians and surgeons are said to have delivered their unanimous opinion at a public meeting, to the effect that the disease was not the Indian Epidemic,—and this at the very time when we know letters were received in this town from other physicians in Sunderland personally familiar with the Indian disease, stating in the most explicit terms, "that if a perfect identity between symptoms, morbid appearances, and fatality, constituted identity of disease, this really was the Indian cholera." The reason the Sunderland practitioners acted as they did is apparent. The strong private interest of their patients in the better ranks, leading we fear to a strong feeling of private interest on their own part, warped their better judgments. It must have required stronger nerves and more independence of mind than most persons possess, to act with an unbiassed disposition in their circumstances.

For some time the protestations of the Sunderland traders and coal-owners, with the Noble Marquis of Londonderry at their head, were supposed by the public to be warranted by succeeding incidents. We cannot tell how often we were asked by friends both out, and even also in the profession, whether the lapse of seven days after the appearance of the first cases, without any more occurring, was not a sufficient proof that the Indian Cholera had not arrived at Sunderland; in all the newspapers this fact was triumphantly appealed to as evidence of the rashness of the medical reporters, and of the calamity they had unwarrantably brought on the town and on the country; and, strange to say, the very same tale was repeated a month afterwards, when the disease broke out in precisely similar circumstances at Newcastle. Is it possible the busy propagators of these notions were ignorant that the disease was following exactly the course which infectious diseases generally pursue? Were they unaware, that at almost every place on the continent where it successively broke out, it followed exactly the course pursued at Sunderland and Newcastle,—an interval of four, seven, ten, or fourteen days having elapsed between the first cases, and its subsequent steady progress?

We are not aware whether any serious attempt has yet been made to trace the introduction of the disease into Sunderland to importation. This much, however, appears on the face of events. The town is one of the nearest in Britain to Hamburg and the Baltic ports, where the epidemic at the time prevailed, and with which the usual intercourse had been subjected for a considerable period to quarantine restrictions by order of the Privy Council. It is at the same time well known to all persons in the vicinity of the different quarantine stations, that for a long time the regulations were every where, at least in this part of the kingdom, violated in the most flagrant manner, owing to the insufficient means provided by government to enforce them,—that every medical person here, who was acquainted with the circumstances, loudly declared that *our* quarantine system would never keep it out, if the disease was contagious,—that in Sunderland particularly the looseness of the quarantine was a subject of familiar observation in the town, nay, that the quarantine station was so placed as to render it necessary for suspected vessels to pass through the vessels lying in harbour in order to reach it,—and that the first cases which appeared, occurred in the person and family of a keelman residing close to the quay,—to which we must also add, that at least one case of malignant cholera has been ascertained lately to have occurred in Sunderland many weeks before in a person from Russia, without the authorities or public in the city knowing any thing of the matter, *although the case was attended by a medical man.* All these facts being considered, in conjunction with what is known of the previous course of the disease in foreign parts, it will appear on the one hand perfectly possible, if not extremely probable, that the disease was imported, and on the other hand almost impossible to arrive at more certain information on the subject. If we understand rightly what has been said of the first breaking out of the epidemic all the unfortunate individuals of the family first attacked died, without any judicial investigation. In such circumstances we can scarcely hope that any subsequent inquiry would lead to trustworthy results,—especially when we reflect on the class of persons on whom reliance must be put,—poor wretches of the lowest rank and most dissipated habits,—masters and crews of vessels who have probably subjected themselves to penalty for violation of the laws,—and traders and other inhabitants who have already shown a determined spirit to conceal and pervert the truth.

Leaving this question, then, with but faint expectation of its ever receiving a satisfactory answer, we shall proceed to give some account of the progress of the epidemic at Sunderland, which we shall do in the words of *Dr Gibson,* whom we have requested to furnish the facts, and who has kindly communicated the following particulars:—" Between the 26th October to 2d November, four cases of cholera occurred, the first in a man named Sprout, who lived on the quay, the second his son, and two others in different parts of the town. Sprout, the father, died,—the son was taken to the Infirmary, where he died,—the other two also died. These four cases occurring simultaneously, or nearly so, you may easily conceive created a great sensation in the town, and, by the unanimous opinion of the medical gentlemen, were reported to government as cases of the continental cholera. Young Sprout was examined. The next case was the nurse in the Infirmary, who had never seen him during his illness, but who had assisted in removing him, and placing him in his coffin. In her the disease ran its course to a fatal termination with great rapidity. On the 3d and 4th November no new case occurred; on the 5th one, which recovered; on the 6th six, five of whom died. These sudden deaths from a new disease might have been supposed sufficient to convince any man possessed of ordinary conviction that something more than the common autumnal cholera was among them. About the end of August, a captain of a ship, which had come to Newcastle from Riga, where he had had the disease, came to Sunderland on the top of the coach, and was so ill that he begged to get down at the first medical man's house the coach passed. He was brought into the surgery of Mr Watson, (who has reported the case since,) with all the manifest symptoms of the disease in a very aggravated form. Mr Watson bled him, administered a mixture containing ether and laudanum, and employed frictions and external heat. The man was shortly able to be removed to lodgings, and recovered. There were also some other single cases in August,—none that I have heard of in September, nor indeed till the 26th October. Since that the disease has continued in Sunderland, selecting for its victims most wretched and dissolute of a very dense pauper population. You are bably unacquainted with the topography of Sunderland; but I may re- itulate the names of the streets and lanes where it seems to be concen- ted. The Quay, Union Lane, Baine's Lane, Harrison's Lane, Mill Street, lor's Alley, Wood Street, Warren Street, and Buck's Court,—these are narrow, filthy places,—the inhabitants in the most crowded state, and tched poverty among whom any disease might assume contagious or ectious qualities. I suppose every individual practitioner who has seen s disease in India, if he confines his views to his own individual expe- nce, would be inclined to think it not contagious; but let him study the ole history of the disease, and especially consider the undeniable fact, t it has uniformly followed the steps of man, and he will perhaps come a different conclusion, although his own direct experience may lead him l to remain not quite satisfied on the point. However, I would leave question in the hands of those who take pleasure in splitting straws, h this one observation, that whether it be contagious or not, it is as ar as the sun at noon-day, that wherever it takes up its abode for a ie, it has the power of spreading."—*Sunderland, December* 11, 1831.

To the same gentleman we are indebted for the following statistical ac- int of the number of persons attacked and carried off by the epidemic ce it broke out. In some of the items his account differs from that which usually been given in the newspapers. In a few of the numbers there deviation also from the returns made officially to government. The son for both of these discrepancies is, we presume, the attempt which, ording to the charge made against them by Drs Daun and Gibson, the dical practitioners and other persons in Sunderland made to conceal cases l misrepresent their nature. In consequence of this unhappy difficulty returns for the first three or four weeks comprehended cases of *Diar- ea, Common Cholera, and Malignant Cholera;* but after that time the icle Diarrhœa, and a few days afterwards the article Common Cholera o, were suppressed. In the following table, in which we have endea- ured to reconcile the discrepant returns as far as we could, the whole ee diseases are included; but the reader will be pleased to keep in view it of the cases returned between the 11th and 21st of November inclu- e, and comprehended in our table, twenty-four were struck off on the ppression of the column for diarrhœa, as having been really cases of that ease. We retain them because we do not know to which days they pro- ly belong.—The first cases having commenced on October 26th, there urred up to

	Cases.	Deaths.		Cases.	Deaths.		Cases.	Deaths.
v. 2,	6	5	Nov. 17,	18	1	Nov 30,	13	4
5,	1	0	18,	21	6	Dec. 1,	8	5
6,	6	5	19,	25	1	2,	17	1
7,	6	2	20,	12	4	3,	7	5
8,	7	3	21,	15	6	4,	5	2
9,	7	4	22,	13	2	5,	5	2
10,	1	0	23,	8	5	6,	8	6
11,	5	2	24,	6	5	7,	7	2
12,	15	0	25,	11	3	8,	19	7
13,	5	2	26,	14	5	9,	10	9
14,	24	4	27,	10	4	10,	17	4
15,	20	4	28,	14	8	11,	10	5
16,	23	6	29,	12	7	12,	9	6
							440	152

Taking these numbers by weeks, counting the first period as terminating the 7th November, and subtracting from the third and fourth weeks their proportion of 24 cases of diarrhœa, under which title we find 40 returned in the third, and 68 in the fourth period, the numbers will stand thus :

First week,	19 cases,	12 deaths.	fourth week,	76 cases,	32 deaths.
second ——	44 ——	15	fifth ——	67 ——	26
third ——	134 ——	28	sixth ——	80 ——	39
				416	152

The relative mortality in the third week shows that at this period many cases of true diarrhœa must have been returned, or that many deaths were concealed.

In Sunderland the disease has appeared with precisely the same characters as in Russia, and more particularly in St Petersburg. Dr Barry has announced this fact from personal observation ; and to every medical reader it is obvious in the descriptions which have appeared. Some violent cases have occurred with sudden excessive collapse at the very commencement, and death in a few hours ; in most, however, there has been a preliminary stage of imperfect formation or milder character ; and in many there has been a secondary typhoid fever, of short duration, and often fatal. The great majority of cases have occurred among debilitated persons, especially drunkards ; but one has occurred in the middle ranks of life, in the person of a Methodist clergyman, who, from the inquiries we have personally made, appears to have had intercourse with two doubtful cases in the course of his duty in visiting his congregation, and, besides, lived six or seven doors from the cholera hospital. Other cases have also probably occurred in a similar station ; but we have no authentic information on the subject. Hitherto the disease has prevailed chiefly in Sunderland proper, in the neighbourhood of the harbour, and but little in Monk-Wearmouth, or Bishop-Wearmouth, which form a large part of what is usually called Sunderland. The whole town contains about 40,000 inhabitants, of whom between 15,000 and 20,000 inhabit Sunderland proper.

We are sorry we can say little of the success of any treatment hitherto tried. We have seen various letters on the subject from the medical visitors of Sunderland ; all of which agree in recommending early blood-letting, moderate doses of opium, diffusible stimulants and aromatics, friction, and heat in the form of dry-heat, as obviously beneficial. But the reader will perceive from the returns, that, since the epidemic began, above a third of the cases have perished, and that increased experience seems by no means to have improved the mortality, for during the last three weeks 97 have died in 223 cases, or not much short of one-half. Some have also used emetics with supposed success ; others have tried to use oxygen, which appears to have procured marked temporary, though no permanent relief ; others again, it is said, have tried cauterization of the back with red hot irons, according to the recommendation of the Central Board, founded on the experience of Dr Lange of Cronstadt. This is a mode of heating the back, which we suspect few patients or their friends will submit to in this country, and the utility of which is certainly very far from being supported by facts so strongly as to warrant the recommendation of it just published by the Board. We may say the same of what appears at present the favourite remedy of the Board, the administration of brine. We have certainly seen no evidence which warrants the very favourable opinion expressed by them of either of these remedies ; and on the face of them there is much absurdity.

While on the subject of the edicts of the Board, we must be allowed to say, that, so far as we are entitled to judge from the acts of the former Deliberative Board, as well as the Executive Board now in action, we grieve to think that neither of them has fully deserved, or actually enjoyed, public confidence. On this topic we are unwilling to enter ino details for reasons which we think ourselves bound to respect. We shall merely observe, that in the formation of a Central Board for the kingdom, we do not see on what sufficient ground it has been considered proper to exclude from its numbers every one of the eminent domestic physicians of London, merely to all appearance because they have not seen the disease. In our understanding, there is no disease under the sun whose features and habitudes, so far as they are known, may be sooner learned, or more accurately known from description merely; and why, in these circumstances, government should not avail themselves of the aid of the most eminent and learned in the profession we know not.

A month after the appearance of the disease in Sunderland, it also broke out in Newcastle. So early as the 26th October, a case occurred there which was regarded by the physicians who saw it as extremely similar to the Indian Cholera; and we strongly suspect it was really of that description. A month later, on the 26th November, two cases occurred, one of which was unequivocally declared to be an example of the malignant disease, and reported as such by the Mayor of the town to the Privy Council. As in the instance of Sunderland, so at Newcastle the natives raised their voices aloud against what they were pleased to call the precipitancy of the Mayor, the daily press took up the cry and sent it throughout the country, and here, as elsewhere, the Newcastle traders and merchants were looked on as greatly to be pitied for the folly of their ruler. To all whom we heard talking in this strain we recommended a patient suspension of their opinion for a week, or at the utmost fourteen days, which interval has commonly been necessary for the epidemic to take a fair start after its first appearance. And accordingly on the tenth day fresh cases occurred, and the disease is confessedly advancing. The Report to Government on the 15th December mentions 15 new cases and 10 deaths during twenty-four hours previous to the making up of the return; and, since the first cases on the 26th November, there have been 61 attacked and 23 cut off. In North Shields, too, not far from Sunderland, several cases have been observed, and regular reports are returned. In several villages around Newcastle and Sunderland scattered cases have also been reported as having presented themselves.

Report of the Edinburgh Board of Health, 16th November 1831.—The EDINBURGH BOARD OF HEALTH having maturely considered what steps should be taken for checking the Epidemic Cholera, if it should appear in this city, are of opinion that the proper time is now arrived for making public the following directions for the guidance of the Inhabitants.

I. The Board are satisfied, that the disease may arise spontaneously from hidden causes; and that it may also become contagious in circumstances not yet ascertained. But they are fully warranted in declaring, that, when it does become contagious, the risk of its spreading in that manner is very much diminished if due attention be paid to cleanliness and sobriety. And they therefore intreat the inhabitants of Edinburgh, in the event of the disease appearing here, not to be misled by exaggerated notions of its contagious nature,—the inevitable tendency of which would be to leave the sick helpless, and without that attendance from friends and others which is more pressingly required in this disease than in any other.

II. Experience has shown, that the most essential precaution for escaping the disease is sobriety,—that intoxication during the prevalence of the epidemic is almost sure to be followed by an attack,—and that those addicted to drinking are the most subject to take cholera, and the most likely to sink under it. In like manner, strict attention to personal cleanliness,—to cleanliness and ventilation of dwelling-houses,—to warm clothing,—to regularity of hours for sleep,—to keeping as much as possible within doors at night,—and to taking food before going out in the morning,—may be relied on as important means of security.

III. The Board are providing, that, should the disease appear, several Hospitals shall be opened over the city;—also that stations shall be established, where, as well as at the hospitals, medicines and heating-apparatus may be procured at all hours of the day and night;—and likewise that, if necessary, all night-watchmen shall be supplied with medicines for the immediate use of any who need them. By these means it will be in the power of every one to procure instant aid.

Notice of the situation of hospitals and stations for medicines will be given the instant the disease may appear.

IV. But to prevent the possibility of delay, especially in the dead of night, when the disease is very apt to begin, the board recommend families to provide the following articles.

1. *Mixture.*—Take sulphuric ether and aromatic spirit of hartshorn, of each half an ounce, compound tincture of cinnamon, one ounce: Mix and cork up carefully.

2. *Laudanum.*—An ounce to be kept in readiness.

3. *Pills.*—Take of opium twenty-four grains; camphor one drachm; spirit of wine and conserve of roses enough to make a mass of proper consistence: Divide into twenty-four pills.

4. *Clysters.*—Take of laudanum an ounce, tincture of assafœtida two ounces: Mix for keeping. Before using, mix three tea-spoonfuls with a wine-glassful of thin starch; and retain it, when injected, by pressure below with a warm cloth, as long as possible.

5. *Mustard-Poultices.*—Have always at hand four ounces of powdered mustard. A fourth part of this, spread over porridge poultices, will be sufficient for one patient.

6. *Hot-air Bath.*—The board have approved of a hot-air bath of a simple construction, which may be seen at the *Blind Asylum*, and made by any carpenter, price about ten shillings. Every family who can afford it ought to have one.

V. No time should be lost in sending for medical aid. But when the disease commences suddenly in a violent form, it is dangerous to lose even the time which must pass before such aid can be had. This form is at once known by sudden weakness, a contracted, ghastly countenance, blueness of the lips, and general coldness, accompanying or preceding vomiting, purging, and cramps. In such cases, the friends will without delay give a table-spoonful of the *Mixture*, No. 1, with 60 drops of laudanum, in half a wine-glassful of *cold* water. Follow this with a table-spoonful occasionally of warm spirits and water, or strongly spiced wine. Repeat two tea-spoonfuls of the *Mixture*, with 30 drops of laudanum, every half hour, if the first dose fail to relieve.—If the mixture be vomited, then give two *Pills*, No. 3, and repeat one every half hour if the first two fail to relieve or be vomited. But after the vomiting and cramps cease, the Mixture or Pills must not be repeated without medical advice.—The *Clyster*, No. 4, should be resorted to also from the first, and repeated once if not retained. —[N. B. The doses of the Mixture, Laudanum, Pills, and Clyster, must not be exceeded. For children of fourteen half the doses mentioned, and for children of seven one-fourth is sufficient.]—The *Hot-air bath*,—or, if it is not at hand, dry heat over the whole body in any shape, such as by hot blankets and hot-bricks, sand, salt, or bottles of hot-water,—together with constant rubbing of the whole body,—should likewise be resorted to from the first.—The *Mustard-Poultices* should, as soon as possible, be applied over the belly and on the soles and calves, and kept on till the patient complains of the smarting.

By the time these measures have been put in force, opportunity will have been given for procuring medical advice; which is indispensable for the treatment afterwards.—The Board think it necessary to apprize the public, that, where this disease has prevailed, blood-letting, when resorted to within the first, second, or third hour from the commencement of the attack, has been very generally found useful along with the other remedies, notwithstanding the appearance of sudden weakness and excessive sinking already mentioned.

VI. By following these rules, and taking prompt advantage of the provision made at the Station-points, the Board are convinced that very many cases will be checked at the outset. But, at the same time, they strongly exhort the labouring classes to convey their sick friends with all speed to the hospitals, rather than try to cure them at home, where they can seldom have the proper means at command. The hospitals will, it is hoped, be so numerous, that one shall be near every man's habitation; and carriages, to serve at the same time as dry-heat baths, may be found always ready at the hospitals and stations, for the instant removal of patients at all hours of the day and night.—The Board feel assured, that, by quickly availing themselves of these provisions, working people will get their sick friends brought sooner and far more effectually under treatment than in any other way; and they must not forget, that every minute's delay is highly dangerous.

VII. The moment the disease is suspected to have appeared, information must be given to William G. Cuningham, Esq. Clerk to the Board, at the City Chambers. And, should it establish itself in the town, medical men are expected to send to the same quarter, every morning before half past nine, a report of each new case, death, or recovery,—specifying the name, residence, age, employment, date of seizure, and date of the event. The Board anxiously look for punctuality in this respect from every medical person.

While the Board think it right to express their apprehension, that in certain circumstances the disease may be communicated by personal intercourse with infected persons or goods, they wish it to be distinctly understood, that, as they are satisfied it may also be diffused in other ways, not yet ascertained,—as they think it will be impossible in this country to establish a system of internal quarantine, or absolute seclusion of the sick,—and as the attempt to do so would throw very many persons into great distress,—they do not mean to recommend that any attempts should be made to prevent its diffusion in this city by seclusion of the sick, otherwise than as detailed above.

N. B.—To Apothecaries.—As an inferior laudanum is sold in some shops, apothecaries are cautioned to use only the strong laudanum of the Edinburgh Parmacopœia. Copies of this Report, and printed labels for the articles recommended by the Board, with directions for their use, may be procured by apothecaries from the Clerk.

By authority of the Board,
JOHN LEARMONTH, *Lord Provost.*

Notice regarding the Half Pay of the Army Medical Officers.—We have hitherto omitted to inform our readers that the Medical Department of the Army has been greatly improved by the promulgation of two warrants, bearing the respective dates of the 22d and 29th July 1830. The medical officers owe Major-General Sir Henry Hardinge a deep debt of gratitude, as it is solely to him they are indebted for the introduction of a measure so liberal. He had not been long secretary at war before he perceived the numerous defects of the old system, more especially in regard to promotion and retirement; and in the new regulations he has effectually obviated its imperfections. The titles of the higher ranks of the department have been changed, and to those who delight in an exuberance of unmeaning discriminative appellations this alteration is a boon. The pay of assistant surgeons who have served ten years is increased; so is that of surgeons who have served above twenty years; and the period when a medical officer has the unqualified right to retire from the service is reduced from thirty to twenty-five years.

Excerpt from the warrant of the 22d July 1830.

34. *Medical Officers.*—The rate of half pay for a medical officer of the army shall in every case be determined by the service which he may have rendered upon full pay, and the circumstances under which he may be placed upon half pay.

35. If a medical officer shall be placed upon half pay by *reduction* of establisment, he shall be allowed the half pay to which his services may entitle him, according to the following schedule:—viz.

Rank of reduced medical officer.	Rates of half-pay after a service on full pay of 30 years per diem.	25 but under 30 per diem.	20 but under 25 per diem.	10 but under 20 per diem.	Less than 10 per diem.
	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
Inspect. Gen. of Hospitals,	1 10 0	1 5 0	1 0 0	.. ..	.. ..
Dept. Inspect. Gen. of Hos.	1 0 0	0 17 0	0 14 0	0 10 6	0 8 0
Assist. Inspect. of Hospitals,	0 17 0	0 15 0	0 12 6	0 10 0	0 7 6
Staff Surgeon, .	0 16 0	0 14 0	0 12 0	0 9 6	0 7 0
Regimental Surgeon,	0 15 0	0 13 0	0 11 0	0 8 6	0 6 0
Assistant Surgeon,	0 7 6	0 7 0	0 6 0	0 5 0	0 4 0

36. If a medical officer shall be placed upon half pay from any other cause than reduction of establishment, he shall be allowed the half pay to which his services may entitle him according to the following schedule, viz.

Rank of retired medical officer.	Rates of half-pay after a service on full pay of 30 years per diem.	25 but under 30 per diem.	20 but under 25 per diem.	10 but under 20 per diem.	Less than 1 per diem
	£ *s.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d*
Inspect. Gen. of Hospitals,	1 0	15 0	12 0	..	..
Dept. Inspect. Gen. of Hos.	0 18	14 0	10 0	8 0	7
Assist. Inspect. of Hospitals,	0 16	13 0	9 6	7 6	6
Staff Surgeon,	0 15	12 0	9 0	6 6	6
Regimental Surgeon,	0 15	11 6	8 0	6 0	5
Assistant Surgeon,	0 7	6 0	5 0	4 0	3

37. Every medical officer who may have served upon *full pay* for 25 year and upwards, shall have the right to retire upon half pay at the rate assigned to his rank and service in the schedule subjoined to the 36th Article, provided he shall have served 3 *years* in the rank from which he retires; but if he shall not have served 3 years in such rank, he shall receiv only the rate attached to the rank from which he was last promoted.

38. If a medical officer shall have served 30 years on full pay, including in the rank from which he retires, or 10 in the colonies, or 5 with an arm in the field in any rank, or, if his services be recommended under any special circumstances of merit, he may be allowed the rate of half pay assigned to his rank in the schedule annexed to Article 35.

Regulations.—1. The rank of apothecary to the forces, and of hospita assistant are henceforth abolished.

2. The title of physician to the forces is to be discontinued, and instea thereof, that of assistant inspector of hospitals is to be established.

3. The medical officers of the army are in future to be distinguished by the following ranks and commissions, viz.

Assistant Surgeon.
Regimental Surgeon.
Staff Surgeon.
Assistant Inspector of Hospitals.
Deputy Inspector General of Hospitals.
Inspector General of Hospitals.

4. *Assistant Surgeon.*—No medical candidate who has not passed his examinations at the Royal College of Surgeons, of London, Edinburgh, or Dublin, shall be eligible for this commission, and the assistant surgeon must have served on full pay five years before he shall be eligible for promotion to the rank of regimental surgeon, and seven years before he shall be eligible for the rank of staff surgeon.

5. *Regimental surgeons and staff surgeons* must have served ten years in the army on full pay, before they shall be eligible for the next step of rank.

6. An assistant inspector of hospitals must have served three years at *home*, or two years *abroad* in this rank, before he shall be eligible for promotion.

7. A *deputy inspector general* of hospitals must have served five years at *home*, or three years *abroad* in this rank, before he shall be eligible for promotion to the highest rank of inspector general.

8. The rates of daily pay for the before-mentioned ranks are to be in future regulated by the length of time which the officers of each class shall have served upon full pay according to the annexed scale: provided always, that when any officer is hereafter promoted, he shall commence upon the minimum pay of his new rank, notwithstanding his length of service, agreeably to the said scale, may give him a claim to a higher rate of pay, as before he shall be allowed such higher rate of pay he will be required to serve on each inferior rate of pay attached to his rank, the following period, namely, *one year* if he had been in the medical department antecedently to the date of this warrant, and *two years* if he received his first medical commission subsequently to that date; but if the officer thus promoted had higher pay in his old rank than the minimum of his new rank, he shall commence upon that rate of pay which may be next above his former pay, and before he obtains any further increase, shall serve the period above prescribed: viz.

Ranks.	Rates of daily pay subject to the above provisions. After 25 years actual service			After 20, but under 25 years actual service			After 10, but under 20 years actual service			Under 10 years act. service		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
Assistant Surgeon,	0	10	0	0	10	0	0	10	0	0	7	6
Regimental Surgeon,	1	2	0	0	19	0	0	15	0	0	13	0
Staff Surgeon,	1	3	0	1	0	0	0	16	0	0	14	0
Assist. Inspect. of Hospitals,	1	4	0	1	2	0	0	19	0	0	0	0
Dept. Inspect. Gen. of ditto.	1	10	0	1	8	0	1	4	0	0	0	0
Inspect. Gen. of Hospitals,	2	0	0	1	18	0	1	16	0	0	0	0

9. In addition to the pay of their ranks, the officers at the head of the medical department on foreign stations shall receive allowances at the undermentioned rates when serving under the following circumstances: viz.—

If with an army in the field of	10,000 men or upwards,	20s. a day
Do.	5000 do.	15 „
Do.	any less number	10 „
If serving in a colony, where the forces consist of 1500 men, or upwards		5 „

By His Majesty's Command,
H. HARDINGE.

Glasgow and its Suburbs.—The following abstract of the different classes of inhabitants in this city and its suburbs, is given by Mr Cleland, who has been employed in classifying the inhabitants of the City of Glasgow, and County of Lanark, for the Government Census, and in preparing relative Statistical statements now in the press, for limited circulation.

CITY AND CONTINUOUS SUBURBS.

Population, Births, Marriages, and Burials.—In 1821, the population was 147,043. In 1831, 202,426; viz. Males, 93,724, Females, 108,702. Increase in ten years, 55,383 souls. There are 137 occupations narrated, with the number of individuals employed in each.

Ages under 5, 30,277—5 to 10, 25,707—10 to 15, 21,211—15 to 20, 20,745—20 to 30, 38,185—30 to 40, 26,419—40 to 50, 18,014—50 to 60, 11,648—60 to 70, 6,920—70 to 80, 2,592—80 to 90, 645—90 to 100, 58—100 and upwards, 5, viz Males, 1—Females, 4.

Of what Country.—Scotch, 163,600; English, 2,919; Irish, 35,554; Foreigners, 353. Total, 202,426. There are many who consider the great influx of Irish as detrimental to this part of the country. This may hold true as regards weavers and indigent persons; but it is only justice to say that but for the numerous industrious Irish labourers, the improvements of late years could not have been carried on with the same beneficial effect.

Of what Religion.—Establishment, 104,162; Dissenters, 70,380; Episcopalians, 8,551; Roman Catholics, 19,333. Total, 202, 426. There are 202,426. There are a number of more Catholics belonging to Bishop Scott's Chapel, but as these do not belong to the Population district, they are not included.

Householders.—Married Men, 30,032; Widowers, 1,790; Bachelors, 1,437. Male Householders 33,259.—Widows, 6,824; Spinsters, 1,88[illegible]. Female Householders, 8,786.—Total Families, 41,965.

The births, including 471 still-born, being 6,868, and the population 202,426, there is one birth for 29 47-100 persons.

The marriages being 1919, and the population 202,426—there is one marriage for 105 48-100 persons.

The burials being 5,185, and the population 202,426, there is one burial for 39 4-100 persons.

The number of Families being 41,965, and the population 202,426, there are 4 82-100 persons to each family.

The births being 6,868, and the number of marriages 1,919, there are 3 57-100 births to each marriage.

Pauperism.—The number of Paupers being 5,006, and the population 202,426,—there is one pauper for every 40 43-100 persons.

The number of paupers being 5,006, and the sum expended for their maintenance, or relief, L. 17,281, 18s. ½d, gives 3*l.* 9s. 0½d. to each Pauper. If the sum for the relief of paupers were paid equally by the whole non-recipient population, the proportion to each would be *one shilling and ninepence, and a small fraction.*

The sum of L. 17,281, 18s. 0½d. includes the entire expenditure of the Town's Hospital, surgeons' salaries, medicines, clothing and educating children, maintaining lunatics, &c.—it also includes the expenditure for the poor of the parishes who adhere to the parochial system introduced by Dr Chalmers, and every other expense.

No. CXI. will be published on the 1*st of April* 1832.

THE

EDINBURGH

MEDICAL AND SURGICAL JOURNAL.

No. CXI.

CONTENTS.

PART I.—Original Communications.

Art. I. On Permanent Patency of the Mouth of the Aorta, or Inadequacy of the Aortic Valves. By D. J. Corrigan, M. D. Page 225

II. Surgical Cases. By John Campbell, M. D. F. R. S. E. 245

III. Observations on the obstetric operation of Turning. By Thomas Radford, Esq. 256

IV. Some Remarks on the Operation of Turning the Fœtus; with the view of showing how it may be performed with the least suffering to the Mother. By John Roberton, Esq. . 263

V. On the Identity of Cow-Pox and Small-Pox. By George Playne, Esq. 269

VI. Cases in Surgery. By Robert Logan, Esq. . . 274

VII. On the Medicinal Effects of the Salts of Morphia, especially the Muriate, with a new mode of preparing it. By Montgomery Robertson, M. D. F. R. S. E. . . . 278

VIII. Narrative of an Epidemic English Cholera that appeared on board the ships of War lying in ordinary in the River Medway during the Summer and Autumn of the year 1831; with Cases exhibiting the Nature and Treatment of the Disease; and inferences on the probable Nature and plan of Cure that might be found successful in cases of Blue or Malignant Cholera. By James Hall, Esq. 295

IX. Observations and Cases illustrative of the Pathology of the Abdominal Viscera in some forms of Indian disease. By C. Morehead, M. D. 308

X. Eighth Report of the Edinburgh Surgical Hospital, from 8th August 1831 to 8th February 1832. By James Syme, Esq. F. R. S. E. 325

XI. Account of the Epidemic Cholera of Newburn in January and February 1832. By David Craigie, M. D. . . 337

PART II.—Critical Analysis.

Art. I. A Treatise on the Diseases of the Heart and Great Vessels, comprising a new View of the Physiology of the Heart's Action, according to which the Physical Signs are explained. By J. Hope, M. D. 385

II. The Anatomy of the Brain, with some Observations on its Functions. By Alexander Monro, M. D. F. R. S. E. To which is prefixed, an Account of Experiments on the Weight and Relative Proportions of the Brain, Cerebellum, and Tuber Annulare, in Man and Animals, under the various circumstances of Age, Sex, Country, &c. By Sir William Hamilton, Baronet, . 408

III. Elements of Surgery. By Robert Liston, Surgeon, . 418

IV. The Principles of Surgery. By JAMES SYME, F. R. S. E. Page 42
V. The Cyclopædia of Practical Medicine. Edited by JOHN FORBES, M. D., ALEXANDER TWEEDIE, M. D., and JOHN CONOLLY, M. D. Part I. 42
VI. A Demonstration of the Nerves of the Human Body. Consisting of Four Parts. By JOSEPH SWAN. Part II. . . 43

PART III.—MEDICAL INTELLIGENCE.

A Third proper Ligament of the Scapula, not yet observed in our Dissectors, or by Anatomical Lecturers. By E. B. SHERRIFFS, Esq. Brechin, 43
Protracted Lactation, a Cause of Hydrocephalus and other serious Disorders in Infants. By Dr EDWARD MORTON, . . . 43
Abstract of Cases of Insanity, with Necroscopic Appearances. By Dr Macrobin, Medical Superintendant of the Lunatic Asylum, Aberdeen, . 43
Medical Effects of the Beulah Saline Spa at Norwood, Surrey. By Dr GEORGE H. WEATHERHEAD, . . . 43
Institution at Brighton for the Preparation of the Factitious Mineral Waters of the Continent, ... 44
On the Treatment of Malignant Cholera by Tartrate of Antimony. From a Report on the Goods of Count G——w, detained in the Government of Saratov, ... 44
On the present distribution of the Medical Staff of the Army, . 44

NOTICES TO CORRESPONDENTS.

COMMUNICATIONS have been received from Mr T. SHAPTER, Mr A. WATSON, and Mr R. C. RUSSELL.

The following works have been received :

A Compendium of Human and Comparative Pathological Anatomy. By Adolph Wilhelm Otto, M. D. &c. translated from the German, with additional notes and references. By John F. South, Lecturer on Anatomy at St Thomas's Hospital. London, 1831. 8vo. Pp. 456.

Descriptio Ichthyosis Corneæ Congenitæ in Virgine observatæ tabulis tribus lapidi incisis illustrata. Auctore Ch. Helw. Schmidt, M. D. Brensæ, 1830. Folio. Pp. 15.

Von der Lage der Organe in der Brusthöhle als Einladungs-Programm zu der an der hiesegen Königlichen Medicinisch-Chirurgischen Lehranstalt, den 7th September 1829. U. S. W. Von Dr A. W. Otto. Königlichem Medicinal-Rathe und Professor. Breslau. 4to. Pp. 37.

Specimen Artis Japonicæ Anthropologico-Medicum, &c. Auctore Carolo Frederico Heusinger, Prof. Med. Marburgi Cattorum. 1830. Folio. Pp. 6. Tom. I.

On Indigestion and Costiveness, with hints to both sexes on the important, safe, and efficacious means of relieving diseases of the digestive organs by Lavements, &c. &c. By Edward Jukes, Surgeon, inventor of the stomach pump. 2d Edition. London, 1831. 12mo. Pp. 196.

Elements of Pharmacy. By Robert John Kane, Professor of Chemistry to Apothecaries Hall, &c. &c. Dublin, 1831.

On the Epidemic Cholera, and other prevalent Diseases of India. By Samuel Dickson, Assistant Surgeon to the Royals, late in the Madras Establishment. Edinburgh and London, 1832. 8vo. Pp. 143.

The Laws and Progress of the Epidemic Cholera. Illustrated by Facts and Observations. By Thomas Hancock, M. D. London and Liverpool, 1832. 8vo. Pp. 118.

Observations on the Origin and Treatment of Cholera and other Pestilential Diseases, and on the Gaseous Oxide of Nitrogen as a remedy in such diseases ; as also in cases of Asphyxia from suffocation and drowning, and against the effects of Narcotic Poisons. By John Hancock, M. D. &c. London, 1831. 8vo. Pp. 58 and Pp. 19.

Substance of a Lecture on Cholera read before a meeting of the Medical Profession of Liverpool, on Wednesday the 18th January 1832. By D. Baird, M. D. Physician to the Fever Hospital. Liverpool and London, 1832. 8vo. Pp. 45.

Letters upon Cholera Morbus ; with Observations on Contagion, Quarantine, and Disinfecting Fumigations. By William Ferguson, M. D. F. R. S. E. Inspector-General of Hospitals. London, 1832. 8vo. Pp. 39.

NOTICES TO CORRESPONDENTS.

An Inquiry into the Medical Properties of Iodine, more particularly in Dropsy; also an Account of the utility of Local Blood-letting in Hydrothorax and Bronchitis. Partly translated from the Latin of T. L. C. Schrœder Van Der Kolk, M. D. By C. J. B. Aldis, A. B. Trin. Coll. Cambridge. London, 1832. 8vo. Pp. 32.

History and Medical Treatment of Cholera, as it appeared in Sunderland 1831. Illustrated by Numerous Cases and Dissections. By W. Haslewood, M. D. and William Mordey, Surgeon. London, 1832. 8vo. Pp. 151.

On the Portable Sudatory or Hot-Air Bath in Cholera Morbus, &c. &c. By M. La Beaume. 2d Edit. 1832. 12mo. Pp. 84.

A Brief Description of Surgical Apparatus, intended to accompany a series of Delineations of the most important Mechanical Auxiliaries of Surgery. By Henry T. Chapman, Member of the Royal College of Surgeons. London, 1832. 8vo. Pp. 115. With a Quarto Atlas of 20 Lithographic Engravings.

The Principles and Practice of Obstetric Medicine, in a series of Systematic Dissertations on Midwifery and the Diseases of Women and Children. Illustrated by numerous Plates. By David D. Davis, M. D. &c. London, 1832. 4to. Parts II. III. and IV. Pp. 32 to 88.

The Anatomical Atlas of Dr M. J. Weber, Professor at the Royal Prussian University Frederic William at Bonn. Parts III. and IV, the Muscles of the Eye and the Fœtal Circulation; with Explanation. London, published by A. Schloss, Foreign, Medical, and General Bookseller, St Martin's Lane, Charing Cross, 1831. And the Original German Explanation.

Engravings of the Nerves from various sources. By C. Mitchell, Engraver; with Letter-Press Explanations by Dr Knox. No. 18, 19, 20, 21, 22. Edinburgh, 1831 and 32.

Practical Observations on Malignant Cholera, as that Disease is now exhibiting itself in Scotland. By D. M. Moir, Surgeon at Musselburgh. 2d Edition. Edinburgh and London, 1832. 8vo. Pp. 71.

The London Medical Gazette, Nos. 11 to 23, from 17th December 1831 to 17th March 1832. London, V. D.

The American Journal of the Medical Sciences, No. XVII. November 1831. Philadelphia. London and Paris, 1831.

The London Medical and Surgical Journal. Nos. 42, 43, of the monthly, and 1, 2, 3, of the weekly series.

THE
EDINBURGH
MEDICAL AND SURGICAL JOURNAL.

1. APRIL 1832.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*On Permanent Patency of the Mouth of the Aorta, or Inadequacy of the Aortic Valves.* By D. J. CORRIGAN, M. D. one of the Physicians to the Charitable Infirmary, Jervis Street, Dublin; Lecturer on the Theory and Practice of Medicine; Consulting Physician to St Patrick's College, Maynooth.—(*With Engravings.*)

THE disease to which the above name is given has not, so far as I am aware, been described in any of the works on diseases of the heart. The object of the present paper is to supply that deficiency. The disease is not uncommon. It forms a considerable proportion of cases of deranged action of the heart, and it deserves attention from its peculiar signs, its progress, and its treatment. The pathological essence of the disease consists in inefficiency of the valvular apparatus at the mouth of the aorta, in consequence of which the blood sent into the aorta regurgitates into the ventricle. This regurgitation, and the signs by which it is denoted, are not necessarily connected with one particular change of structure in the valvular apparatus, and hence the name *Permanent Patency of the Mouth of the Aorta, or Inadequacy of the Aortic Valves*, has been chosen as simply expressing such a state of the parts as permits the regurgitation to occur.

I have been in the habit for some years of describing this disease under the name of *Inadequacy of the Aortic Valves*; but as Dr Elliotson, in his elegantly written work on Diseases of the Heart, has given to a somewhat analogous morbid state of the auriculo-ventricular opening, a better name, *Permanent Patency*, I have, for that reason, and for the sake of uniformity, adopted the term, and I shall continue to use it as synonymous with my own term, *Inadequacy* of the Aortic Valves.

The morbid affections of the valves and aorta permitting thi regurgitation are the following.

1st, The valves may be absorbed in patches, and thus become reticulated and present holes, through which the bloo flows back into the ventricle.—*Vid.* Plate I. Fig. 1.

2d, One or more of the valves may be ruptured; the ruptured valves, when pressed, flapping back into the ventricle instead of catching and supporting the column of blood in th aorta, the blood then regurgitating through the space left b the broken valves.—*Vid.* Plate I. Fig. 2.

3d, The valves may be tightened or curled in against th sides of the aorta, so that they cannot spread across its mouth and an opening is then left between the valves, in the centre o the vessel, through which the blood flows freely back into th ventricle.—*Vid.* Plate I. Fig. 3.

4th, The valves without any proper organic lesion may be rendered inadequate to their function by dilatation of the mout of the aorta. The aorta, affected by aneurism, or dilated, as i frequently is in elderly persons, about its arch, will sometime have the dilatation extending to the mouth of the vessel, an in such a case, the valves become inadequate to their functio not from any disease in themselves, but from the mouth of th aorta dilating to such a diameter, as to render the valves unable to meet in its centre; the blood then, as in the other instances, regurgitates freely into the ventricle.

Fig. 1. This figure scarcely needs any explanation.

It shows the reticulated valves.

The letters A, A, A, A, point out the openings produce by absorption in the valves, through which the blood regurgitated. These valves were very slightly thickened.

Fig. 2. A, points out the left-hand valve, with an openin through it large enough to admit a goose quill, and rupture from its connection with the aorta, so that it flapped back int the ventricle.

B. Bony depositions on the inner coat of the aorta.

C. The middle and right hand valves thickened, and contracted in their free edges, so that they could be separated onl a very short distance from the sides of the aorta.

D^r CORRIGAN'S *Cases of permanent patency of the Mouth of the Aorta.*

Fig. 1.

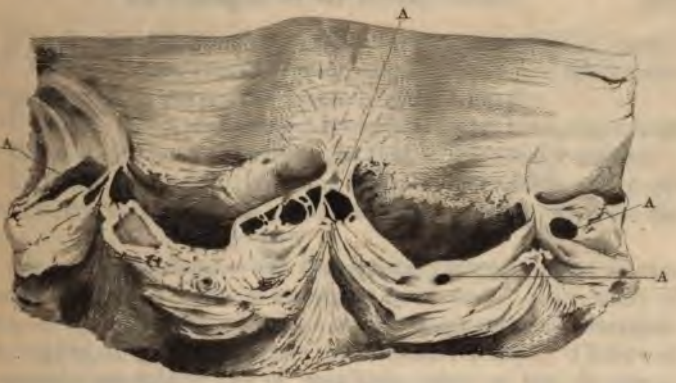


Fig. 2.

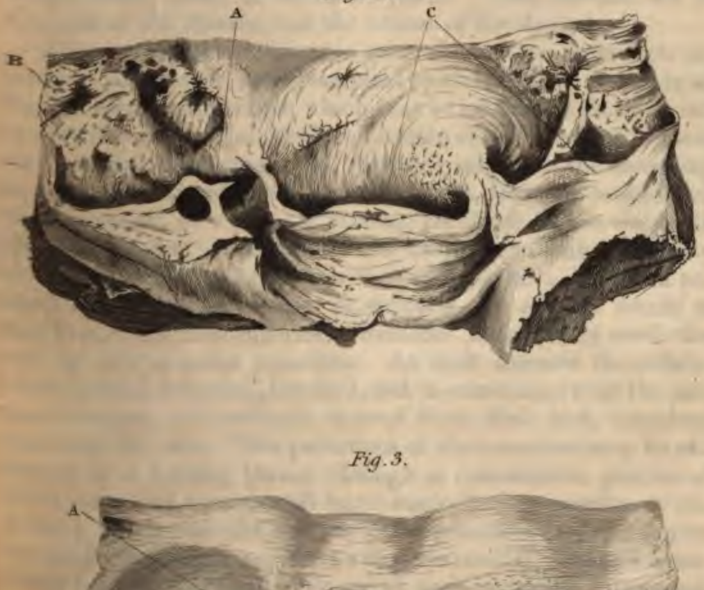
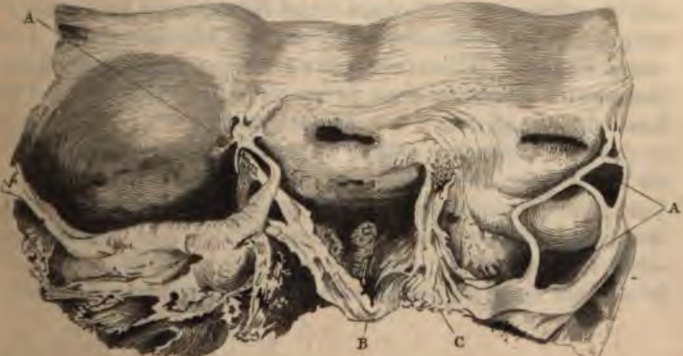


Fig. 3.



Eng^d by G. Aikman, Edin^r

Fig. 3. A, A, Openings in the valves, as in Fig. 1, produced by absorption, one of the openings in the right hand valve large enough to permit the finger to pass through.

B. Middle valve, projecting downwards, curled back, and bound to the aorta by bony deposition, so that it was totally useless.

C. Bony deposition tying the edges of the middle and right hand valve together, and at the same time gluing them to the aorta.

General Symptoms.—On the general symptoms that accompany this disease, little is necessary to be said. Like most of those connected with affections of the respiratory and circulating organs, they are uncertain and unsatisfactory. There are frequently convulsive fits of coughing, more or less dyspnœa, sense of straitness and oppression across the chest, palpitations after exercise, sounds of rushing in the ears, and inability to lie down. Neither one nor all of these symptoms are essential to the disease. They may all arise from varied affections of the lungs, heart, liver, or nervous system. They neither tell us the seat of the disease, nor the extent of the danger.

Signs.—What is deficient in general symptoms from their obscurity, is, however, amply supplied by the certainty of the physical and stethoscopic signs, which may be referred to the three following indications. 1*st*, Visible pulsation of the arteries of the head and superior extremities. 2*d*, *Bruit de soufflet* in the ascending aorta, in the carotids, and subclavians. 3*d*, *Bruit de soufflet* and *fremissement*, or a peculiar rushing thrill felt by the finger, in the carotids and subclavians. In conjunction with these may be reckoned the pulse, which is invariably full. When a patient affected by the disease is stripped, the arterial trunks of the head, neck, and superior extremities immediately catch the eye by their singular pulsation. At each diastole the subclavian, carotid, temporal, brachial, and in some cases even the palmar arteries, are suddenly thrown from their bed, bounding up under the skin. The pulsations of these arteries may be observed in a healthy person through a considerable portion of their tract, and become still more marked after exercise or exertion; but in the disease now under consideration, the degree to which the vessels are thrown out is excessive. Though a moment before unmarked, they are at each pulsation thrown out on the surface in the strongest relief. From its singular and striking appearance, the name of *visible pulsation* is given to this beating of the arteries. It is accompanied with *bruit de soufflet* in the ascending aorta, carotids, and subclavians; and in the carotids and subclavians, where they can be examined by the finger, there is felt *fremissement*, or the peculiar rushing thrill, accompanying with *bruit de soufflet* each diastole of these vessels. These three signs are so intimately connected with the pathological causes of the disease, and arise so directly from the mechanical inadequacy of the valves, that they afford unerring indications of the nature of the disease. In order to understand their value, it is necessary to consider their connection with the cause by which they are produced. The visible pulsation of the arteries of the neck, &c. may be first examined.

In the perfect state of the mechanism at the mouth of the aorta, the semilunar valves, immediately after each contraction of the ventricle, are thrown back across the mouth of the aorta by the pressure of the blood beyond them, and when adequate to their function of closing the mouth of this vessel, they retain in the aorta the blood sent in from the ventricle, thus keeping the aorta and larger vessels distended. These vessels consequently preserve nearly the same bulk during their systole and diastole. But when the semilunar valves, from any of the causes enumerated, become incapable of closing the mouth of the aorta, then after each contraction of the ventricle, a portion of the blood just sent into the aorta, greater or less, according to the degree of the inadequacy of the valves, returns back into the ventricle. Hence the ascending aorta and arteries arising from it, pouring back a portion of their contained blood, become, after each contraction of the ventricle, flaccid * or lessened in their diameter. While they are in this state, the ventricle again contracts and impels quickly into these vessels a quantity of blood, which suddenly and greatly dilates them. The *diastole* of these vessels is thus marked by so sudden and so great an increase of size as to present the visible pulsation which constitutes one of the signs of the disease.

That this visible pulsation of the arteries is owing to the mechanical cause here assigned is made evident by several circumstances. It is most distinct in the arteries of the head and neck, which empty themselves most easily into the aorta, and of course into the ventricle. In the arteries of the lower extremities, of even larger size than those which present it about the head and neck, it is not seen to any comparative degree, and most generally not at all while the patient is standing or sitting. It is much more marked in the arteries of the head and neck in the erect than in the horizontal posture; and a patient suffering under the disease himself, first pointed out a circumstance which is convincing of its being produced as asserted. He could increase the pulsation of the brachial and palmar arteries in a most striking degree by merely elevating his arms to a perpendicular position above his head. He thus enabled the brachial and palmar arteries to empty themselves more easily back upon the aorta. They became more flaccid, and then, on the next contraction of the ventricle, their diastole became comparatively greater, and their visible pulsation of course more marked. The same effect could be produced in the arteries of the lower extremities by lying down and elevating the legs on an inclined plane. The strength of the heart has little to do in producing this singular pulsation, for it is never observed in an equal degree, and most generally not at all, in the arteries of the lower extremities.

---

* It may be objected to the phrase *flaccid*, that the arteries, being capable of contracting upon whatever quantity of blood they may contain, are never flaccid. In using the phrase, it is not meant that the sides of the arteries, like a collapsed vein, fall together, but merely that, having become emptied of some of their blood, in consequence of its regurgitation into the ventricle, they are, while in this state, less tense than when at the next diastole they are distended by a fresh supply of blood to their limit of extension.

If it be asked, is the explanation here adduced of the cause of this visible pulsation sufficient to account for its appearance in the brachial and radial arteries, since the blood to return back from these vessels into the arch of the aorta should flow upward when the patient holds his arms in the ordinary position, flexed or hanging by his side? the following reply may be made. When the subclavians are pouring back their blood into the arch of the aorta and ventricle, the elasticity of the brachial arteries, acting upon the blood just urged into them, forces it back along with the retrograde current of the subclavians, no obstacle meeting it in that direction. The brachial arteries thus partially empty themselves, and become in their systole of a lessened diameter like the carotids and subclavians, but in less degree. The next jet of blood from the ventricle dilates them, and as in the subclavians, produces in them a visible pulsation: and if they be assisted in returning their blood by elevating the arms to a perpendicular position, their pulsation becomes, as has been already observed, much more strongly marked. The arteries of the lower extremities are not similarly circumstanced. The arteries of the upper extremities are assisted in emptying themselves back towards the heart, by the retrograde current in the subclavians and ascending aorta; but on the blood contained in the arteries of the lower extremities, the tall column of blood in the descending aorta is pressing, and prevents any return; or if it be supposed that of the large mass of blood in the descending aorta, a small portion flows back into the arch, it can produce little change in the contents of the iliacs and femorals; and moreover, whether the column of blood in the aorta be lessened or not in diameter, the pressure on the contained blood of the iliacs and femorals will remain the same, and keep these vessels distended. If we, however, as already observed, alter the relation of the several arteries to the arch of the aorta, so as to facilitate the reflux of their contained blood, for instance from the radial arteries, by raising the arms to a perpendicular line above the head, from the iliacs and femorals, by placing the patient in a recumbent posture, and raising the legs upwards on an inclined plane, the visible pulsation becomes much more marked in these respective arteries.

The *bruit de soufflet*, which is heard in the ascending aorta, carotids, and subclavians, with the accompanying *frémissement* in the latter arteries, is next to be considered. The *bruit de soufflet* characterizing this disease, is heard, as already observed, in the ascending aorta, its arch, and in the carotids and subclavians. It can be followed upwards from the fourth rib along the course of the aorta, increasing in loudness as it ascends, until it is heard of great intensity at the upper part of the sternum, where the arch of the aorta most nearly approaches this bone, and then branching to the right and left, it can be traced into the carotids and subclavians of both sides; and in these trunks it assumes a harshness that it did not possess in the aorta. This *bruit de soufflet* is synchronous with the visible pulsation, with the diastole of the arteries. It is of no consequence whether the ascending aorta and its large branches be sound or be diseased; the *bruit de soufflet* is as loud in the one case as in the other. To account for the presence of this sign, and why it extends so far from the seat of the disease and along sound vessels, it is necessary to refer to a paper published in the Lancet of 1829, Vol. ii. p. 1. Continued observations from the date of that paper to the present, have confirmed the view then taken of the cause of that singular sound; of its being dependent purely on a physical cause, on a mechanical change in the manner of the blood's flowing.

In that paper is related an experiment, which it may be well to recapitulate here. A flexible tube, such as a piece of small intestine, or a portion of artery, is connected by one end with a tube which has a current of water of considerable force running through it. While the piece of intestine or artery is kept fully distended by the supply of water from the tube, no sound is produced by the motion of the fluid; but if the flexible tube, while the fluid is moving through it, be pressed upon in any part, so that the quantity of fluid passing through the contracted part is no longer sufficient to keep the further portion of the tube tense, then, beyond the contracted part, where the tube is less tense, or in some degree flaccid, a distinct, and, according to the velocity or force of the current, a loud *bruit de soufflet* is heard; and, at the same time, if the finger be gently laid upon the part of the tube where the *bruit de soufflet* is heard, a slight trembling of the tube is perceived, evidently arising from the vibrations into which the current within is throwing its sides. If, in place of constricting any one part of the flexible tube, the whole tract of tube be allowed to become partially flaccid, by diminishing the supply of fluid, and the fluid be then allowed to rush along the tube by jets, at each jet the tube is suddenly distended, resembling the visible pulsation described above; and with each diastole of the tube, there is a sudden and loud *bruit de soufflet;* and, synchronous with the *bruit de soufflet,* there is *fremissement* felt by the finger.

Both the sound heard and the sensation felt by the finger in this experiment may be explained by the principles which regulate the motion of fluids. It may be remarked, that it is a property of fluid in motion, that, when discharging itself from the orifice of a tube into open space, or into a vessel of wider capacity not fully distended, its particles move in lines from the orifice, like so many *radii* tending to leave vacuums between them. When the flexible tube, artery, or intestine, therefore, is kept fully distended, the fluid moves forward as a mass, there is no tendency in its particles to separate from one another,—they all press equally,—there is no vibratory motion of the sides of the tube, and consequently no sound, and no *fremissement* or trembling. But if the tube be not kept fully distended, then the fluid propelled through it rushes along as a current; and its particles tending to leave vacuums between them, throw the sides of the tube into vibrations, which can be very distinctly felt by the finger, and which give to the ear the peculiar sound *bruit de soufflet*, and to the touch *fremissement.*

These principles may be applied to the state of the ascending aorta and its branches in the instances before us. When the aortic valves are fully adequate to their function of perfectly closing the mouth of the aorta, and thus preventing any regurgitation of blood, the aorta and its branches are kept fully distended, the blood is at each contraction of the ventricle propelled forward *en masse*, and there is no trembling, or vibratory motion of the sides of the aorta, carotids, and subclavians, and, as in the flexible tube when fully distended, no sound is emitted. But when the valves, becoming inadequate to their office, permit some of the blood contained in the ascending aorta, carotids, and subclavians, to return into the left ventricle after each contraction, then the aorta and these trunks become, like the flexible tube in the second part of the experiment, partially flaccid; and at the next contraction of the ventricle, the blood propelled into them is sent along as a rushing current, which throws the sides of these arteries into vibrations, and these vibrations give to the ear *bruit de soufflet*, and to the finger *fremissement.* These two signs may be traced to a varying distance from the mouth of the aorta, and always along the carotids, and to the outer third of the subclavians, and sometimes in the brachial arteries, as far as the bend of the arms, the distance to which they are heard being determined by the limit to which the current-like motion of the blood producing them is extended. In those cases in which the deficiency of the valves is considerable, allowing a full stream of blood to rush back into the ventricle, there is heard in the ascending aorta a double *bruit;* the first accompanying the *diastole* of the artery, the second immediately succeeding ; and, in listening to the two sounds constituting this double *bruit de soufflet*, the impression made distinctly on the ear is, that the first sound is from a rushing of blood up the aorta, the second from a rushing of it back into the ventricle. It is impossible for those who have not heard this double *bruit* to conceive the distinctness with which the impression described is made on the ear. A patient in one instance heard this double sound distinctly in his own person, and referred it to its cause, a rushing of blood *from* and *to* the heart. The *bruit de soufflet* and *fremissement* are not perceived in the arteries of the lower extremities, when the patient is in a sitting or standing posture. The pressure of the blood in the abdominal aorta is sufficient in these postures to keep the vessels arising from it fully distended ; and thus no vibratory motion of their parietes being permitted, there is no bellows sound, nor *fremissement* or rushing thrill.

History and Progress of the Disease.—Of eleven cases of the disease, only two occurred in females, and in both of these the valves were nearly quite sound in texture ; but the aorta being thinned and dilated, the valves could not meet so as to prevent regurgitation. None of the cases occurred in very early age. The youngest person presented labouring under the disease was twenty years of age. In this respect, inadequacy of the aortic valves differs from narrowing of the left auriculo-ventricular opening, which is not unfrequently met with in children, and even in infants at the breast. The causes of the disease are uncertain. In one case the disease followed an attack of acute rheumatism, which had been accompanied with symptoms of *pericarditis.* In some cases the commencement of the disease was referred by the patient to an inflammatory affection of the chest, which had occurred months or years before; while in others no cause or date could be assigned.

The symptoms accompanying its commencement and progress are very variable. Most generally the patient describes the first sensations as having been a feeling of oppression and straitness across the chest, with palpitation of the heart on any unusual exercise. These symptoms become gradually more distressing, and are after a very uncertain period of time accompanied by fits of coughing resembling paroxysms of asthma, and terminating in scanty expectoration. In a few cases, however, cough was not at any time, even up to the last hours of life, an urgent symptom; the oppression and straitness of the chest, with palpitation on any exertion, and an anxiety for a supply of fresh air, being the principal complaints. As the disease proceeds, the straitness and oppression about the chest become more distressing; fits of coughing more frequent; and the patient has an anxiety, approaching to agony, for a free supply of fresh air, frequently starting from bed at night under the dread of suffocation. In the last stage the state of suffering is extreme. The patient will not lie down for a moment from the dread of suffocation. The face, which had been pale, becomes purple on the lips as in suffocative catarrh; œdema of the legs comes on, followed ultimately by œdema of the hands and arms; there is no sleep, or there are almost incessant startings from it; the countenance assumes a most painful expression of sinking; and the patient at length dies exhausted. The pulse in no case was under eighty. It ranged from that to 110; and in every case it has been all through the disease (unless influenced by medicine) full and vibrating, even to within a few hours of death. In the course of the disease, the superficial branches of the carotids, the brachial arteries, the radial, and the ulnar, and their branches, wherever near enough to the surface to be traced, become apparently enlarged, and remarkably tortuous;—the brachial artery in parts of its course often almost doubling upon itself. The *fremissement*, or rushing thrill, described as easily felt in the subclavians and carotids, can sometimes be felt by moderate tact as fast as the pulse in the wrist. The heart in all the cases that occurred was enormously enlarged, and its bulk arose from the state of the left ventricle, which in some cases was so much enlarged in cavity and in thickness, as to make the organ resemble rather the heart of a bullock than that of a man. The other parts of the heart, although necessarily obliged to keep pace in some measure with this increased size, did not at all partake equally in the enlarged bulk. The impulse of the heart was far less than natural, even in cases where the hypertrophy of the left ventricle was greatest. In some of them no impulse could be felt; and in none did the impulse during life give at all a proportional measure of the excessive hypertrophy discovered after death. *

---

* Laennec has stated, and his assertion is supported by many, that the degree of impulse is always a correct index of the degree of hypertrophy of the ventricle, but it is now admitted by some most capable of judging, that the impulse of the heart is

Hæmoptysis very rarely occurs in the course of the disease, and the lungs are generally found after death permeable to air, and remarkably healthy. This is owing to the sound state of the auriculo-ventricular opening, and of its valves. This opening being full sized, permits the blood to pass with freedom into the ventricle, where it is retained by the sound auriculo-ventricular valves; and thus those sudden congestions of the blood-vessels of the lungs, so common in narrowing of the left auriculo-ventricular opening, are remarkably rare. The manner of death in inadequacy of the aortic valves is different from that in narrowing of the auriculo-ventricular opening. In the latter, owing to the obstacle presented by the narrowed opening to the passage of blood into the ventricle, the lungs are by any slight exciting cause suddenly congested; and the patient dies, not from the direct effect of the organic affection of the heart, but from the superinduced affection of the lungs,—pulmonary apoplexy, pneumonia, or suffocative catarrh. In the disease under consideration, the patient appears to die of mere exhaustion. The inefficiency of the valves of the aorta throws a great increase of labour on the left ventricle. The muscular energy of this part of the heart is in the course of time worn out. The heart is at length incapable of sustaining the column of blood incessantly pressing upon it; it ceases to contract, and is found after death largely distended with blood. The symptoms preceding death are in accordance with this state. For some days, or even weeks, before death, nature appears to be struggling against overwhelming exhaustion. The patient is constantly in the most heart-rending tone imploring to be relieved of the weight that is upon him; the countenance expresses the greatest sinking and distress; there are anxious calls for fresh air, and a continual restlessness, similar to what is seen in a patient sinking from hemorrhage; and when in this state the patient in some trifling motion dies exhausted.

The duration of this disease is very uncertain. No case was

---

not to be considered a gauge of the hypertrophy of the ventricle. Andral, in his "Clinique Medicale," Vol. ii. p. 160, says "Plus d'une fois dans des cas où apres la mort nous avons *trouvé les parois des ventricules tres epaissies en même temps que leurs cavités etaient notablement agrandies, nous n'avions reconnu pendant la vie aucune espèce d'impulsion*. Dans d'autres cas, où il y avoit simple hypertrophie du ventricule gauche, avec grande diminution de sa cavite (hypertrophie concentrique de MM. Bertin et Bouillaud,) il n'y avait pas eu non plus d'impulsion appreciable." Piorry (sur la Percussion, p. 139) says, that impulse of the heart, carried even to raise the head of the observer, is far from being a constant sign of hypertrophy. Dr Graves, in a clinical lecture, (*vid*. Med. Gazette, March 1831, p. 714,) says, "I can assert in the most positive manner, that I have seen cases of pneumonia in which the heart's pulsation continued violent until within a short time of dissolution; so much so indeed, as to induce the erroneous belief in myself and other medical attendants, that this organ was in a state of hypertrophy and dilatation, and yet it was found after death to be in every respect healthy." This subject will be resumed at another time.

of less duration than two or three years, and some of the cases at present under treatment have been of seven or eight years standing. The time during which the disease may continue without terminating fatally, seems to depend principally upon the extent to which regurgitation is permitted. The cases in which the valves, from small perforations, allowed but little regurgitation, continued for many years; while the case which furnished the Plate No. II. and in which the valves were ruptured and much injured, allowing considerable regurgitation, terminated fatally in less than three years.

Diagnosis.—Inadequacy of the aortic valves may be confounded with narrowing of the mouth of the aorta, either congenital or from diseased valves, with disease of the auriculo-ventricular valves, with aneurism of the arch of the aorta or *arteria innominata*, with nervous palpitations, and with asthma. Congenital narrowing of the mouth of the aorta is a very rare disease, but narrowing of the mouth of this vessel produced by vegetations on the valves is not unusual; and *bruit de soufflet* is a sign common to it, and to the disease we are considering. The resemblance between the signs of the two diseases extends, however, no farther. The visible pulsation of the arteries, arising from the arch of the aorta, which forms so striking a sign of inadequacy of the aortic valves, is wanting in narrowing of the mouth of the aorta. The pulse also is strikingly different in the two diseases. In narrowing of the aortic orifice it is small and contracted; in inadequacy of the aortic valves it is invariably full and swelling. In narrowing of the aortic orifice there is generally a marked contrast between the pulse and the impulse of the heart. The pulse is small and contracted; the impulse of the heart is strong and energetic. In the disease we are considering, when there is a contrast it is always in the inverse way; for while the arteries beat with violence, and the pulse is strong and full, the impulse of the heart is scarcely perceptible. When the mitral valves, becoming indurated or ossified, produce narrowing of the auriculo-ventricular opening, that narrowing produces *bruit de soufflet*; * and the *bruit de soufflet* thus produced might be confounded with that accompanying inadequacy of the aortic valves. Independently of the visible pulsation of the arteries, and the state of the pulse, which accompany inadequacy of the aortic valves, stethoscopic examination points out with certainty the distinction of the two diseases. When the *bruit de soufflet* is produced by narrowing of the auriculo-ventricular opening, it is heard loudest just where the impulse of the heart against the side is felt; it comes with the impulse, and if loud it seems to rush into the ear; and as the stethoscope is removed from this point upwards along the sternum, it is heard growing fainter the farther the point of examination is from the point where the impulse is felt. In inadequacy of the aortic valves, the converse holds. For over the point where the impulse is or should be felt, *bruit de soufflet* is either not heard at all, or heard very indistinctly; but as the stethoscope is moved upwards from the heart, in a line corresponding with the ascending aorta, the *bruit de soufflet* is heard growing louder and louder, until over the arch of the aorta, and in the large trunks arising from it, the sound grates upon the ear with harshness.

---

* The principles regulating the motion of fluids, already laid down, explain the production of *bruit de soufflet* in narrowed auriculo-ventricular opening. The blood at each contraction of the auricle discharges itself from a narrow orifice into the ventricle, "a vessel of wider capacity not fully distended."—"The particles" of the blood "move in lines from the orifice, like so many radii tending to leave vacuum between them." This motion, as in the experiment of the tube, throws the sides of the ventricle into vibrations, which produce on the ear *bruit de soufflet*, and if the heart thus affected come forward so as to transmit through the parietes of the chest this vibrating motion, the hand laid over the heart perceives a *fremissement*, or trembling in the organ, the *bruissement* of Corvisart.

Permanent patency of the mouth of the aorta may be mistaken for aneurism. If the arch of the aorta and *arteria innominata* approach more nearly than usual to the notch of the sternum, the visible pulsation at the root of the neck becomes so prominent, as to lead to a supposition that there is aneurism, and even of considerable size at this part.

Very lately a case came under my observation, in which there was a remarkable resemblance to aneurism. So strong were the pulsations for years in the region of the *arteria innominata*, that until the examination after death there was never even a doubt expressed that the case was not aneurism. The aorta was thinned, and was dilated so much as to render the valves inadequate to their office, and leave a permanent patency between them. The *arteria innominata*, the carotids, and subclavians, were also dilated beyond their natural size, thus increasing the appearance of the pulsation, but there was no trace whatever of aneurism in the *arteria innominata*, such as had been supposed to exist there during life. An acquaintance with the disease under consideration, and a knowledge of the fact, that a violent throbbing at the root of the neck, or notch of the sternum, may arise from another cause than aneurism, will prevent the forming of a rash opinion on the cause of the violent throbbing. This throbbing may proceed from aneurism, or may arise from inadequacy of the aortic valves. When it proceeds from aneurism of the arch, or of the *arteria innominata*, it is confined to the vessel or the region of the vessel affected; the other trunks arising from the arch present only their natural, or even a diminished pulsation, and there is in the trunks arising from the arch neither *bruit de soufflet* nor *fremissement.* On the contrary, when the throbbing at the notch of the *sternum*, or in the region of the *arteria innominata* is from inadequate aortic valves, all the larger trunks arising from the arch pulsate in an equal degree, or with trifling differences, arising merely from the relative sizes of the vessels, or their relation to the surface, and they are never at any time without *bruit de soufflet* and *fremissement.*

Not only in relation to treatment, but in regard to the patient's mental anxiety, it is of importance to be aware, that inadequacy of the aortic valves may, by this violent pulsation at the root of the neck, closely simulate aneurism of the arch of the aorta, or the root of the *arteria innominata.* In aneurism of the aorta life is not for a moment secure, and it may be necessary that even for a remote hope of cure the patient should totally abstain from all exertion. In permanent patency of the mouth of the aorta the fatal result is never sudden; and under proper restriction the patient is not only able to lead an active life for years, but is actually benefited by doing so.

The two diseases, aneurism of the aorta, and inadequacy of the valves, may, however, be combined. Aneurism of the ascending aorta may, by extending to the mouth of this vessel, dilate it so, that the valves are unable to meet, and there is then a combination of the two diseases; there is aneurism and there is permanent patency of the aortic opening. The first cases that came under my observation presenting the signs of inadequacy of the aortic valves were cases in which the valves were rendered useless in this way, namely, by the mouth of the aorta sharing in the aneurismal dilatation. These cases led me into an error; for, meeting the signs of permanent patency of the aortic orifice in conjunction with aneurism, I erroneously attributed to the aneurism the signs which arose from the permanent patency.* Aneurism of the aorta of itself does not produce the signs arising from permanent patency of the mouth of the aorta. It can only produce them in the way already described, by involving in the dilatation the mouth of the aorta; and hence, when in conjunction with an aneurismal tumour of the *arteria innominata* or aorta, there are found visible pulsation, *bruit de soufflet*, and *fremissement* in the ascending aorta, and the trunks arising from it, we may be certain, that, in addition to the aneurism, there is a defect in the aortic valves, or that the aneurism has extended downwards, involving the mouth of the aorta. On the other hand, if these signs be absent, the valves are sound, and the mouth of the aorta is not included in the disease. The propriety of performing Mr Wardrop's, or indeed the common operation for aneurism about the neck, might depend on the information thus acquired of the state of the aortic valves. To perform either in a case where the aneurismal dilatation was so extensive as to involve the mouth of the aorta, or where the aortic valves were diseased, would only bring the surgical treatment of the disease into unmerited discredit.

---

* *Vide* Lancet for February 7th 1829.

Palpitation of the larger arterial trunks, depending on derangements of the nervous system, will sometimes in their violence simulate the visible pulsation arising from inadequate aortic valves; and in females these palpitations will last not only for months but for years, and seem to justify an opinion that there is organic disease of the heart. This nervous palpitation is not, however, accompanied by *bruit de soufflet* and *fremissement;* and the absence of these two signs is conclusive as to the nature of the disease. Sometimes, however, more than one examination is required before pronouncing a positive opinion; for in a nervous patient, the alarm excited by the first examination will render the circulation hurried and irregular, and hence there may be in the carotid or subclavian a momentary *bruit de soufflet.* In making the examination it is moreover necessary, that the edge of the stethoscope should not be allowed to press on the artery, because its pressure is sometimes sufficient in those cases to produce the sound. When the *bruit de soufflet* and *fremissement* are only momentary, no value should be attached to them. In permanent patency of the aorta they are never absent. The convulsive fits of coughing ending in difficult mucous expectoration have made some cases of this disease be mistaken for asthma, and the state of the pulse has served to maintain the error; for the pulse being remarkably full, as it always is in the disease we are considering, seemed to be sufficient evidence that there was in the heart no obstruction to the circulation; hence the convulsive fits of coughing were supposed to have their origin in the lungs. With a knowledge of the signs afforded by the disease, no one of even moderate acquaintance with the stethoscope can confound it with asthma; without a knowledge of the stethoscope it will, however, be impossible in very many instances to distinguish between the two diseases. General symptoms will give no information on which the slightest reliance can be placed.

✓ *Treatment.*—There is no class of diseases to which the scientific principles that guide modern medicine have been less applied than to diseases of the heart. From its curious mechanism, from the varied derangements to which that mechanism is subject, from the number of tissues that enter into its formation, and from its numerous sympathies, its diseases frequently demand most opposite lines of treatment; and yet it would seem, from the perusal of works on the subject, that one principle were thought sufficient for guiding the treatment of nearly all the diseases of this important organ. With the idea of heart disease, is too frequently associated the notion that such disease, without regard to its precise nature or its cause, requires the action and continued enforcement of measures calculated to exhaust strength and depress vital energy; and this error is sanctioned by the standard works on the treatment of heart disease.

Corvisart says, that "in a great number of organic lesions of the heart, as, for example, in active aneurism, the indication is to diminish the general strength of the patient, and that of the heart in particular." Laennec, p. 739, says, that "though we cannot remove indurations of the valves and narrowing of their openings, we are nevertheless in such cases to follow up the same measures, (bleeding and starving) to remove or diminish hypertrophy:" and Bertin, p. 233, states that "the treatment of valvular alterations is to consist of general and local bleedings, of low diet, of preparations of digitalis," &c.; and p. 367, "that the measures to be employed against hypertrophy are to be essentially antiphlogistic, and calculated to produce debility." A little reflection on the nature of the disease now before us will show that these principles are inapplicable both to the treatment of the valvular alterations, and of the hypertrophy of the left ventricle, which accompanies that alteration.

The disease we are considering is an inadequacy in the valvular apparatus at the mouth of the aorta permitting a regurgitation of blood into the ventricle. In the perfect state of the valvular apparatus at the mouth of the aorta, the valves support by intervals the column of blood in the aorta, and the heart with its ordinary complement of fibre and of muscular strength, is with this assistance competent to the office it has to perform. But when, in consequence of a deficiency in the valvular apparatus, the heart does not receive its due share of assistance from these valves, and is obliged to perform not only its own function of propelling the blood, but has in addition to support after each contraction a portion of that weight of blood which should then be wholly supported by the valves, it is no longer in its ordinary state equal to the task imposed upon it. In such circumstances, nature, to enable the heart to perform the additional labour thrown on it, increases its strength by an addition of muscular fibre, and the heart thus becomes hypertrophied, in accordance with the general law, that muscular fibres becomes thickened and strengthened when there is additional power required from it. Is this hypertrophy disease, or is it a wise provision of nature, by which the organ is thus made equal to the increased labour it has to perform? On the answer depends the treatment to be adopted; and on this there is no room for hesitation. A heart of ordinary strength could not, under the circumstances, carry on the circulation: and nature then wisely endows the heart with the requisite degree of strength. It is at once obvious that to interfere with this wise provision of nature, to diminish the strength of the heart, or, if we choose other words, to direct, according to the advice of Laennec, Bertin, &c. our measures against the hypertrophy of the organ, is to deprive the system of the only power which enables the heart to carry on the circulation. No one thinks of directing measures to diminish hypertrophy of the muscular tissue of the stomach, in narrowing of the pylorus from scirrhus of the bladder or rectum in stricture of the urethra or intestines.

In these instances the hypertrophy is recognized as a provision of nature to make the power of the part equal to the obstacle it has to overcome; and yet this simple principle seems to have been entirely overlooked in diseases of the heart, as if this organ possessed muscular fibres of a different nature from other organs, or as if, in adapting itself to obstacles affecting its action, it follows laws different from other muscular parts. The consequence of the neglect of this principle has been, that too often, in treatment of a valvular alteration in the heart, there has been a constant struggle between nature and medicine. Nature has been making the organ equal to its task; while medicine has been directed to counteract nature's efforts, and, by weakening the organ, to render it totally incapable of its task. The repeated bleedings, the starvings, the enforcement of debilitating measures, are totally unsuited to the disease we are considering.

Instead of such treatment, the measures most beneficial are those which, by strengthening the general constitution, will give a proportionate degree of vigour to the muscular power of the heart, and thus enable it to carry on the circulation in the absence of that assistance which it ought to receive. With this view, a generous and sufficient diet of animal and vegetable food should be advised, at the same time that an abstinence from those beverages, such as malt liquors, which increase much the mass of the fluids, should be enjoined. It is not at all necessary that the patient should be prohibited from attending to his business or profession, provided that he do not devote to it so much attention as to produce debility. And as there is among patients who have learned that they are afflicted with heart disease an universal dread of sudden death, it is necessary to undeceive them on this point; and in the present instance it can be done with perfect safety, as the termination of the disease is never sudden. This plan of treatment, opposite to what has been generally enjoined, was forced upon the attention long before the reasoning adduced here had been brought to support it.

One case may be mentioned, out of many that occurred, showing the bad effects of debilitating treatment in the disease before us, and exemplifying the evil of acting as if one principle were sufficient for guiding us in the treatment of all heart diseases. It is now several years since a consultation was held upon the case alluded to. The treatment ordered was in accordance with that generally recommended, consisting of repeated small bleedings, blistering, the exhibition of digitalis, and the most rigid regulation of diet, a total abstinence from animal food, and even a spare allowance of vegetables and milk. At the time the patient, a young man, was put under this treatment, he was not in an alarming state; but the disease being recognized as heart disease, he had the fortitude to submit to a course which he was led to expect held out a prospect of cure. Bleeding after bleeding, and blister after blister, were repeated, starvation enforced, and digitalis exhibited, until the patient was reduced to such weakness that he had scarcely strength to raise himself in bed. The local disease was all this time, however, growing worse; for the palpitation, cough, &c. were, from the slightest cause, increased to greater violence than previously to the commencement of treatment. The plan was, nevertheless, persevered in, until the patient's death being supposed at hand, this debilitating treatment was discontinued. From that hour the patient got better; and as muscular strength returned, the embarrassment of breathing, palpitation, cough, &c. became less and less urgent. The patient is still alive, the disease is still present; but, with full living and good air, he is able not only to take considerable exercise, but even to undergo the fatigue of a business that constantly requires very laborious exertion.

Having laid down the plan of treatment proper to be adopted as far as it produces effects upon the system, and through it upon the heart constituting a part of the system, it now remains to examine the propriety of employing in this disease a remedy such as *digitalis*, which produces a specific effect upon the heart rendering its action slow and weak, and which in consequence of that effect is usually recommended in cases of heart disease in conjunction with the measures already deprecated. In inadequacy of the aortic valves the pulse generally ranges from 90 to 110. After each contraction of the ventricle during the pause or interval of rest occurring between that contraction and the next following, a quantity of blood is regurgitating into the ventricle. The danger of the disease is in proportion to the quantity of blood that regurgitates, and the quantity that regurgitates will be large in proportion to the degree of inadequacy of the valves, and to the length of pause between the contractions of the ventricle during which the blood can be pouring back. If the action of the heart be rendered very slow, the pause after each contraction will be long, and consequently the regurgitation of blood must be considerable. Frequent action of the heart, on the contrary, makes the pause after each contraction short; and in proportion as the pauses are shortened, the regurgitation must be lessened. Instead, then, of regarding an increase of frequency in the action of the heart as an aggravation of the disease, it must be viewed, as we have already viewed hypertrophy of the heart, as a provision for remedying as far as possible the evil consequences arising from inadequate valves. To retard in such circumstances the action of the heart would be to do an injury. In every case of this disease in which *digitalis* has been administered, it has invariably aggravated the patient's sufferings. The oppression has become greater; the action of the heart more laboured; the pulse intermittent, and very often dicrotic, from the heart's being unable by a single contraction to empty itself; general congestion and dropsy, if present, have been increased, and in some of the instances *bronchitis* from congestion has been induced; the respiration became laborious, and the strength so much sunk, that patients seemed almost moribund. From this state they only recovered by omitting the *digitalis*, and putting them on stimulants. In no case of this disease did *digitalis* produce the slightest good effect; and in all, the patients while under its exhibition were always worse.

A moderately quick pulse indeed is of itself no evil;—it is only an evil as an indication of some disease. In the present instance it is, however, an index of a positive good; it shows that the pauses between the contractions of the ventricle are short, and, consequently, that there is less danger of the quantity of blood thrown back upon the ventricle in the pause of its action, or intervals of rest, being of any considerable amount. The pulse, which in this disease ranges from 90 to 100, or even rises higher, is not to be interfered with merely because it is more frequent than natural. The more frequent action of the ventricle indicated by that pulse is a safeguard against regurgitation. In this respect permanent patency of the aortic opening differs from narrowing of the auriculo-ventricular opening. In permanent patency, as already explained, frequent contractions and short pauses are the best safeguard against regurgitation. In narrowing of the auriculo-ventricular opening, on the contrary, slow action of the heart is an object of the first importance; for a slow action of the auricle will allow more time for the passage of the blood through the narrowed opening, and thus diminish the regurgitation upon the pulmonary veins and the lungs.

Although depleting measures and a lowering plan of treatment have been deprecated in the management of inadequacy of the aortic valves, and although the continued employment of such measures in cases of this disease, instead of bringing relief, never fails to produce an aggravation of symptoms, there are, however, circumstances in which the most active treatment is called for. Inflammatory affections, congestions, &c. are more likely to occur in patients suffering from any obstacle to the circulation than in others, and whenever these supervene in patients labouring under inadequacy of the aortic valves, whether they be inflammatory affections or congestions of the thoracic or abdominal viscera, they call for the most prompt and active treatment. Instead of the heart affection inducing us to be less active in our treatment, it is a motive to be more prompt than in ordinary cases. It may be a fatal mistake to suppose that the presence of the heart disease is to make our measures less energetic. Pneumonia, peritonitis, acute rheumatism, have occurred in some of the cases that have been under observation, and the patients have borne depletion even better than persons without any heart affection. It is a curious fact, that bleeding carried to a very large amount has never in these cases produced fainting. In this case the well-established principle, that in acute diseases the more prompt and decided the measures, the more rapid will be the recovery of the patient, and the less troublesome the sequelæ of the disease, should be our guide. The inflammatory affections that may incidentally occur in cases of inadequacy of the aortic valves, should be opposed with promptitude and decision; bleeding, when used, should be large; but when the inflammatory affection is once subdued, we should cease as soon as possible from debilitating treatment,—which, if persevered in, will prove injurious to the organic affection. No details need be given of the measures to be adopted in those incidental affections, because they differ in no respect, except in energy, from the usual treatment for the affection, whatever it may be, that has chanced to supervene. This active treatment on the occurrence of local inflammation is not at all incompatible with the course recommended to be followed when there is no disease present but the valvular inadequacy. Those incidental inflammatory or congestive affections will be rendered less likely to occur by the previous course of management recommended; for the greater vigour the system has enjoyed, the less danger there is of slight causes producing inflammation or congestion.

Lastly, There is besides the supervention of local inflammation or congestion, yet another circumstance, in which blood-letting may be required. Without the occurrence of any apparently adequate cause, straitness of chest, difficulty of breathing, tumultuous action of the heart, and a general feeling of nervous oppression are complained of. Neither pneumonia nor inflammatory action in any organ can be detected, and these symptoms seem to arise from an increase of bulk in the absolute mass of blood circulating, which keeps all the vessels so distended that the heart becomes oppressed, incapable of freely contracting, and tumultuous in its action. Relief is at once afforded by a large blood-letting, speedily followed by the exhibition of a full dose of an opiate. For the employment of the opiate, I am indebted to the suggestion of my colleague Dr Hunt, and its good effects are such as to have no substitute for it. The employment of a large bleeding in either of the circumstances here detailed, is very different from the repetition of those irritating small bleedings that are usually practised.

Fits of coughing are sometimes very troublesome in the course of the disease, and where they arise from trifling bronchitis, they are best relieved by pectoral mixtures with a large proportion of opium, not less than four or five grains to an eight ounce mixture.

In these observations no medicine or treatment has been recommended with the view of acting directly on the aorta or valves, so as to restore in any degree the function of the latter. There is no medicine that can have any such power after the disease has been of much standing; and if the valves have become perforated or broken, it is obviously impossible to restore them to their original state. The disease is seldom seen in the commencement. Perhaps if seen early in those cases where it has followed an attack of rheumatism, or where it partakes of an inflammatory character, the employment of mercury pushed to salivation, and counter-irritation, might check the progress of the disease. In the advanced stages no good effect on the valvular affection has been produced by any or all of these measures.

Although the cure of *Inadequacy* of the Aortic Valves i probably out of the reach of medicine, a correct knowledge o the nature of the affection is not the less necessary. The patien is relieved from harassing treatment, that, however applicable i other cases of heart disease, is not alone useless, but positivel injurious in this. In other affections of the heart there is a con stant danger of sudden death from pulmonary apoplexy or he morrhage, which may be induced even by ordinary exertion, an such danger keeps the patients in a state of perpetual terror. I this disease, on the contrary, assurance may be given agains any sudden termination; and the patient may be permitted no only to attend to his business or profession, but may be assured that, in leading a life of business and tolerable activity, he i adopting the very best means to prolong his life. Under trea

Dʀ CAMPBELL'S CASES.

Fig. 1.

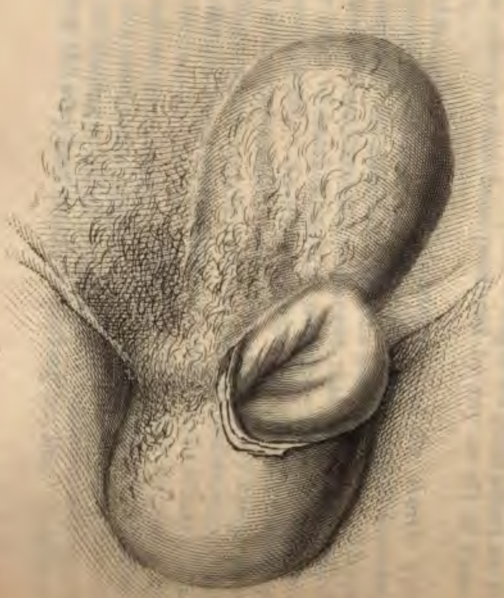


Fig. 3.

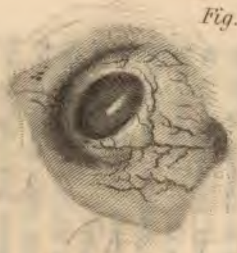
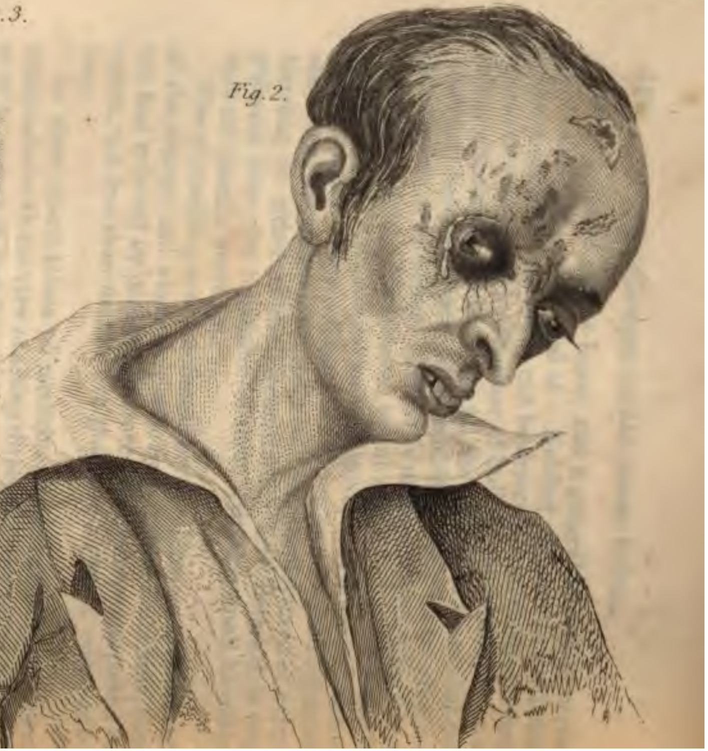


Fig. 2.



ment such as recommended, it is astonishing what little uneasiness inadequacy of the aortic valves will produce,—indeed, very often not so much as those organic affections or growth of the liver, which are nevertheless viewed by the profession and by patients with much less terror.

13, *Bachelor's Walk, Dublin.*

Art. II.—*Surgical Cases.* By John Campbell, M. D. F. R. S. E., Surgeon to the Royal Infirmary, Edinburgh. *(With Engravings.)*

Case I.—*Case of Spreading Gangrene of the Lower Extremity, in which amputation of the Thigh was successfully performed.*—John Burns, æt. 28, admitted into the Royal Infirmary, December 31st 1830. The right leg and foot are much swelled; the leg is of a natural colour, but the foot is of a bluish tinge, and pits somewhat on pressure. A little above the ankle there is a pretty deep impression or indentation, extending round the limb, as if a cord had encircled it very tightly. Over the inner aspect of the limb, in this situation, the cuticle has been torn off, and the cutis feels hard and dry, and is of a brown colour. No crepitus can be felt on examining the limb carefully. He states that the injury was caused at two o'clock A. M., by the limb having become entangled in a rope passing between the shore and a ship under weigh in Leith harbour. He is uncertain how long the rope was tightly applied round the limb, but thinks it must have been for the space of at least six or seven minutes. Skin hot and dry; pulse 90, and full.

Applicentur hirudines viginti, et postea foveantur partes læsæ Decocto Papaveris. ℞ Tartrat. Antimonii gr. ii.; Sulphat. Magnes. ℥iss.; Aq. Fontan. lb. i. Solve. Sumat uncias tres omni hora donec alvus respondeat.

Jan. 1*st* 1831.—Bowels freely moved by the medicine; some nausea and occasional vomiting; foot cold, and sensibility much diminished below the part where the rope was applied; above this, it is of a natural temperature.

Contr. fotus, et applicetur Spt. vin Camphorat. dilut.

Jan. 2*d.*—Foot rather more swelled, and still cold; sensibility continues much diminished; cutis on the anterior surface of the constricted part is hard and dry; glands of groin enlarged, and tender to the touch. Says that he has occasionally severe pain in the foot.

Applicetur cataplasma emolliens.

Evening.—Complains of severe pain in the leg and foot from the weight of the poultice; had some rigors, which have now ceased; skin hot; headach; much thirst; pulse 120, and full.

> *Venæsectio ad ℥xvi. Habt. Solut. Tart. Antimon. Omittatur cataplasma et reptr. fotus cum Decocto Papaveris.*

Jan. 3d.—No return of shivering; some sweating and occasional vomiting in the night; no headach; pain of foot continues; leg more swelled, and covered by an erysipelatous blush; pulse 120, and not so full.

> *Contr. Solut. Tartrat. Antimon. 3tia quaque hora. Foveantur crus et pes Decocto Anthemidis Nobilis.*

Jan. 4th.—Had some shivering during the night; headach; tongue furred; much pain of leg, extending to the toes. The foot and parts about the ankle have a livid hue; pulse 120; bowels open.

> *Habt. h. s. Haust. Anodyn. cum Tinct. Opii. gtt. xl. Omittr. solut. Tartrat. Antimon.*

Jan. 5th.—Slept well during the early part of last night; pulse 120; sweats much; great thirst; complains of severe pain in the leg. The foot is now more livid, quite cold, and devoid of sensibility; the integuments, as far as the knee, are of a brownish hue; great effusion appears to have taken place into the limb, and this extends some way up the thigh.

As the gangrene appeared to be making rapid progress, my colleague, Mr Liston, who visited the patient for me during my absence as a witness at a public trial, now sent to request my immediate attendance. As we agreed that no time was to be lost in removing the limb, I performed the double flap amputation high in the thigh, at half-past two o'clock. The patient made little or no complaint during the operation. It was found necessary to secure twelve or fourteen vessels, and a considerable quantity of blood was lost. The flaps were brought into apposition, and secured by means of stitches. After the operation, the pulse was very feeble and fluctuating; but it rose again in about two hours, after six ounces of wine had been taken.

> *Sumt. h. s. Haust. cum Tinct. Hyoscyam. ʒi. Liquor. Opi Sedativ. gtt. xl.*

Jan. 6th.—Slept for some time after taking the draught. At two o'clock A. M. he became restless; vomited frequently and complained of pain in the stump; pulse weak and fluttering.

> *Sumat Opii gr. i. Camphoræ gr. vi. pro re nata.*

Also, one ounce of brandy in gruel every half hour. The camphor and opium were vomited up, but he retained some brandy and water.

Evening.—Pulse 110, and tolerably firm. Has taken during the evening some strong beef-tea, and one ounce of brandy occasionally.

Jan. 7th.—Slept some during the night; pulse 100, and firm.

To continue the brandy and beef-tea, according to the state of the pulse. Arrow-root for breakfast.

Jan. 8th.—The dressings were removed yesterday from the stump, which had a very healthy appearance, and discharged a considerable quantity of well-formed pus. Stitches not removed.

Habt. vin. Hispan. ℥*x.*

Jan. 9th.—Considerable sweating during the night; otherwise the same as at last report.

℞ *Infus. Colomb.* ℥*xvi.; Acid. Sulphuric. Aromat.* ʒ*iss.*
M. A wine-glassful three times a-day.

Contr. vin., et Spt. vin. Gall. Habt. h. s. Haust. cum Tinct. Opii et Spt. Æther.-Nitros.

Ordered beef-tea and calfs-foot jelly.

Jan. 10th.—Stump looking well, with a considerable discharge of healthy pus. Pulse firm. Bowels are regulated by means of enemas administered from time to time.

Jan. 12th.—Continues better. Pulse 90, and firm; bowels open; tongue clean. Stitches were removed two days ago. Partial adhesion had taken place.

Applicetur Lotio Sulphat. Zinci.

Jan. 15th.—Had some cough, difficulty of breathing, and pain in the epigastrium during the night, which have now subsided. The wine and brandy were omitted, and he was ordered an *enema domesticum.* Stump doing well.

Jan. 17th.—Passed a restless night; pulse weak and slow; respiration hurried and feeble; countenance sharp and anxious.

Reptr. Spt. Vin. Gall. ℥*vi. Habt. Vin. Rub.* ℥*x.*

Jan. 18th.—Feels much better; pulse firm; respiration natural; discharge from the stump moderate in quantity, and healthy looking.

Having given such a detail of the symptoms which occurred during the first fortnight after the operation as appears necessary, it would be tedious to continue a minute account of those which took place afterwards. The general state of the patient varied from time to time, as well as the appearance of the stump; the pulse occasionally becoming feeble and frequent, accompanied with profuse perspirations, and the discharge varying in quantity and quality; but, by the use of a nourishing diet, wine, and tonics, all unfavourable symptoms were ultimately removed, and a perfect recovery took place. The cure, however, proved tedious, owing chiefly to the formation of a succession of small abscesses in the stump, which did not become firm and properly consolidated until between three and four months after the operation. I met the patient, many months afterwards, in good health, walking with the assistance of an artificial leg.

Observations.—Amputation of an extremity during the continuance of a spreading gangrene, and before a line of separation has taken place between the dead parts and the living, is a practice which was at one time condemned almost universally by surgical writers; nor was it until a comparatively late period that the propriety of the rule laid down upon this subject came to be called in question. When we consider, indeed, that the doctrine alluded to has been supported and enforced by men of the first eminence in the profession, amongst whom it is sufficient to mention the names of Sharpe, Pott, and Richter, it is not surprising that few felt disposed to deviate from a rule which had received the sanction of such high surgical authority. But this maxim or dogma, so long taught as an acknowledged principle in the schools, and assented to by practitioners as of universal application, has in the course of more extended observation and experience, undergone certain modifications, and has been shown to admit of some exceptions. Larrey pointed out the important practical distinction (as affecting or determining the question of amputation) between traumatic gangrene and that arising from constitutional causes; and a similar principle has been recognized by other writers of deserved reputation, who have likewise sanctioned the removal of a limb in cases of mortification arising from external or mechanical causes, before nature has set limits to the progress of the disease by any visible line of demarcation. It may be supposed that the examples of success already published by Larrey, Hutchison, Lawrence, and others, * are sufficient to establish fully the propriety of the practice now mentioned; but, as the instances of a fortunate result are not very numerous, I have thought that another well-marked case terminating favourably under circumstances apparently not very promising, might prove worthy of being recorded.

Amputation in the present case was not resorted to until nature seemed unable to resist the farther progress of the disease, by throwing off the diseased parts; while, on the other hand, it was not delayed until those symptoms had supervened which would have rendered the propriety of an operation very questionable, or have made it altogether unjustifiable. The case may be regarded, according to the principles of an able writer,* as an example of local humid gangrene, in which the constitution was not implicated to such an extent, nor the system so much exhausted, as to deprive it of the power of originating and maintaining actions which were subsequently required for the safety of the whole.

---

* Amongst those who deserve to be ranked as the earliest advocates for the practice of amputating in cases of traumatic gangrene, before a line of separation has taken place, I ought to mention Mr Curtis, a naval surgeon, who appears to have carried the practice into effect at Madras in 1782.—See Clinical Lectures by Sir George Ballingall, 1828, p. 8.

The nature of the accident will sufficiently explain the occurrence of gangrene in the parts below the seat of the injury. It is evident, that the soft parts immediately surrounded by the rope must have sustained a severe degree of constriction and contusion, accompanied with rupture of the vessels, so that the latter were rendered incapable of carrying on the circulation, and of preserving the vitality of the limb below. It is worthy of remark, that, before the operation, the inguinal glands of the affected side were noticed to be enlarged and painful, and also that, during the operation, some infiltration was observed to have taken place into the parts which were divided by the knife; but these circumstances were not more discouraging than the state of parts observed in a case recorded by Larrey, and which also terminated in an equally favourable manner as the present. †

Some time after the operation, symptoms supervened denoting much constitutional disturbance, and a state of prostration indicating extreme danger, viz. great frequency and fluttering of the pulse; anxiety of countenance; jactitation; and frequent vomiting. These symptoms, however, were gradually removed by the free exhibition of stimulants repeated at short intervals. In a particular state of the system following capital operations, I have found that plan of treatment, which consists in the very free administration of stimulants, attended by the most beneficial effects; but the practice is one which requires careful regulation on the part of the medical attendant, and one also which no nurse can be properly qualified to direct; it requires, as an eminent author remarks, ‡ the devotion of a few hours to the life of a fellow creature. Sometimes, before any other very marked symptoms of exhaustion have appeared, the contents of the stomach are returned by what physiologists have termed Regurgitation,—a symptom which I have almost invariably seen followed by a fatal result.

In a case like the present, we are recommended always to cut the ligatures short; * but where the cure by adhesion is attempted, I have found the practice so frequently followed by tedious suppurations that I have now abandoned it. Here the ligatures were cut short, excepting that upon the principal artery; adhesion partly took place; and, as a succession of abscesses formed at distant periods, I am disposed to ascribe the protracted cure, in part, to the presence of the ligatures.

---

* Guthrie on Gun-shot Wounds, p. 116, sq.

† Mem. de Chirurg. Milit. iii. p. 162.

‡ Travers on Constitutional Irritation, p. 456.

CASE II. *Inguinal Hernia, terminating in Artificial Anus.*—Mary Drummond, æt. 65, admitted 9th February 1831, has a large inguinal hernia on the left side, which extends into the *labium pudendi.* There is no pain felt on handling the swelling. The integuments, particularly at the neck of the tumour, are œdematous, and pit on pressure, and are a very little redder than natural. The abdomen is a little swollen, but pressure does not excite any pain in it. Bowels not opened for six or seven days. She has taken no medicine. Pulse frequent; tongue furred; some thirst; a little sickness. The hernia has existed for six years, but was always easily reduced till two years ago, when it came down for four days. Many attempts were made to reduce it, but failed. At last she reduced it herself. It came down on Friday last in the morning, and in the evening she reduced it entirely; but it again protruded, and has since remained down. The taxis has been tried, and a considerable portion of the contents of the tumour returned.

One ounce of castor-oil, and three pounds tepid water, ordered to be injected into the anus by means of Reid's syringe.

Feb. 10*th.*—Continues much the same; bowels opened since the enema; tumour free from pain.

Sumt. Ol. Ricini. ℥i. Reptr. Enema.

Feb. 11*th.*—Bowels freely opened last night; slept well; pulse less frequent; tumour as yesterday.

Feb. 12*th.*—Bowels opened yesterday without medicine; has slept well; tongue still furred; some thirst. She now states that the tumour has not been wholly reduced for six months. There is reason to believe that she has made repeated attempts at reduction since her admission into the hospital.

Feb. 14*th.*—Had some tendency to diarrhœa yesterday. This morning at four o'clock a small slough separated towards the lower part of the tumour, and a considerable quantity of feculent matter flowed out. A portion of membrane, supposed to be part of the sac, protruded through the opening.

Opening to be enlarged. Habt. Juscul. Vitulin. lb. ii. Injiciatur Enema cum Tinct. Opii gtt. lxx. si perstiterit Diarrhœa.

---

* Guthrie on Gunshot Wounds, p. 127.

Feb. 15*th*.—A probe-pointed bistoury being introduced, the opening was still farther enlarged. Fæces pass freely by the wound. A considerable portion of the bowel is now observed protruding, but the orifice in the gut cannot be discovered.

Ordered a nourishing diet of jellies and strong soups. Veal-soup also to be injected into the rectum. An emollient poultice applied to tumour.

Feb. 16*th*.—Feels easy. Has passed some fæces by the natural way, but more by the preternatural opening.

Feb. 17*th*.—Has had a natural stool, but the greater part of the fæces pass by the wound. Sleeps well; appetite good; pulse 86; tongue still furred. Part of the sac, which is separating off, has been removed with scissors. A large sponge applied to absorb the feculent matter, and prevent excoriation.

Ordered an enema of tepid water morning and evening, and an occasional dose of *Ol. Ricini.*

Feb. 18*th*.—One natural stool, rather costive. Fæces pass out freely at the groin.

Feb. 20*th*.—Bowel becoming retracted. Wound otherwise much the same.

The cataplasm having been removed, mild superficial dressings were applied, and the sponge continued, in order to protect the parts from the acrimony of the discharge. Under this plan of treatment, and the general means already mentioned, the protruded portion of bowel was soon retracted into the abdomen, while the stercoral discharge from the groin gradually diminished in quantity, accompanied by a corresponding contraction in the wound; and the patient left the hospital in good health, the fecal fistula being nearly closed up. Some discharge, however, took place for several months afterwards, but the opening finally healed up three months ago, since which time she has observed no return of the discharge; and she is now in perfect health, following her usual occupation.

Observations.—This case is one of considerable interest as an example of hernia, in which the tumour gave way without the previous occurrence of such symptoms as would have justified an operation. In looking over the histories of similar cases in the works of authors, I have not found one altogether parallel. No symptoms of strangulation occurred while the patient was in the hospital, and I could not ascertain that any had existed previous to her admission, unless those which have been enumerated may be considered as indicating a degree of chronic strangulation, or that state termed by French authors *hernie par engouement des matières.* The patient bore the free handling of the tumour without complaining during my attempts at the taxis; there was no vomiting, nor tension or pain in the abdomen; and the bowels acted freely after an enema had been administered. And yet the subsequent rupture of the bowel, and the sloughing of the sac, would seem to indicate that an inflammatory action had been going on for some time before, unless it be supposed that the intestines having been loaded with hardened fæces, these, in being forced through the neck of the sac, had lacerated the gut, allowing the fæces to escape, which would be more likely to occur if any adhesion existed there, confining the bowel at any particular point. When the fæces, rendered more acrid by stagnation, had thus escaped into the sac, it will not be difficult to account for the sloughing and suppuration which ensued. The superficial redness of the integuments, which was very slight, might probably have been caused by the frequent and forcible attempts which the patient is believed to have made in order to accomplish reduction. After a free outlet was given by incision to the feculent matter, the gut itself was left undisturbed. A considerable protrusion of the intestine took place, which was most conspicuous after the sac had sloughed off, but the prolapsed portion was afterwards gradually retracted within the cavity of the abdomen.* (See Plate II. Fig. 1.) The treatment was confined to the daily administration of an enema of tepid water, with the view of soliciting the passage of the intestinal contents by their natural route,—to occasional doses of the *Oleum Ricini*,—and to the use of nutritious soups, which were also injected into the rectum; while the parts were preserved clean and free from excoriation by means of a large sponge kept constantly applied.

This case illustrates forcibly the practical importance of the rule which inculcates the propriety of non-interference on the part of the surgeon, beyond assisting the efforts of nature by means of the most mild and unirritating treatment; and it proves the justness of the remark made by an eminent author, that the restoration is safest when most gradual, when there is evidence of an existing sympathy between the repair of structure and the return of function.†

---

* The protrusion was different from that which occurs in a subsequent stage of artificial anus where the gut is inverted. One of the most remarkable cases of the latter description is recorded by Desault, (Œuvres Chirurg. par Bichat, ii. 370.) Other cases of prolapsus will be found in Travers on Inj. of Intest. 162; Lawrence on Ruptures, 365; Hennen, Milit. Surg. 407; Scarpa on Hernia, 339. For an interesting case of rupture of the intestine, see the latter work by Wishart, 361.

† Travers on Injuries of Intest. 371.

A case of hernia with mortified intestine occurred two years ago in the Royal Infirmary, upon which I operated, and which was followed by artificial anus. It terminated in a closure of the stercoral orifice, though this did not prove permanent. Occasionally no discharge was perceptible for three or four weeks at a time, after which it again returned. A minute portion of feculent matter is still discharged now and then through the fecal fistula; but by wearing a truss the man is able to follow his occupation as a labourer in the fields.

CASE III. ***Contraction of the mouth remedied by an operation.*** —Mrs Jaffray, æt. 55, admitted 25th August 1831. There are three or four irregular, elevated crusts, of different dimensions, and of a dark colour, situated on the forehead and sides of the face. The skin immediately around them is slightly scaly, but free from any inflammation or uneasiness. The whole of the integuments of the face are smooth, glistening, and superficially pitted, with slight ulcerations in some parts, and in others presenting the appearance of recent cicatrizations. The lower eyelids are partially everted, the cilia have fallen out, and the tears trickle down the cheeks. The aperture of the mouth has undergone considerable contraction during the process of cicatrization, and the articulation and mastication are in consequence considerably impaired. There is no eruption on any other part.

She states that the above complaint is of three years' duration, and thinks that it first attacked the nose and upper lip. Since then, it has travelled over the whole face, and as it has declined in one part it has appeared in another. The incrustations after dropping off leave a raw ulcerated surface, which, after discharging for some time, gradually heals up. She is unable to give any history of the process which the eruption follows, and is ignorant of the nature of such remedies as have been used.

August 29th.—℞ *Axung.* ℥*iss.; Hydriodat. Potass.* ʒ*i.;*
Iodin. grs. xv. Applicetur ulceribus mane et vespere.

Under the use of this application, the ulcerated surfaces were cicatrized by the 10th September. As the patient now expressed an anxious desire that an attempt should be made to remedy the contracted state of the mouth, I performed the following operation. The point of a bistoury, with a very narrow blade, was introduced into the edge of the upper lip, close to the angle of the mouth, and carried outwards in the direction of the ear, for a short space, keeping it between the integuments and the mucous membrane of the mouth. The point of the instrument was then made to protrude through the integuments, which latter were divided as far as the bistoury had penetrated, by turning its cutting edge towards them. A corresponding incision was made in the same manner from the edge of the lower lip, and parallel to the first. These two incisions were next united by a lunated one made between their extremities on the cheek, and convex towards the ear. The portion of integuments included in these incisions was now dissected out, together with some condensed cellular substance lying over the subjacent mucous membrane, which latter was left entire, after having been separated for a short way from the integuments at their cut edges. I then divided the exposed portion of mucous membrane along its middle, leaving a small portion of it entire at the outer angle, opposite the lunated incision mentioned above. The divided edges of the mucous membrane were next everted and brought into contact with the cut edges of the integuments, to which they were secured all round by means of sutures. A similar operation was performed at the opposite angle of the mouth, after which the parts were covered with some folds of surgeon's lint moistened with cold water, which was directed to be renewed from time to time.

Some tumefaction of the parts took place on the following day, but this soon subsided, and on the fourth day the sutures were removed, adhesion having been then sufficiently completed.

Observations.—This patient was admitted into the Medical Wards of the Royal Infirmary under the care of Professor Christison, who pointed out the case to me, and suggested that the defect in the mouth might probably be remedied by the operation proposed and practised by Dr Dieffenbach, of Berlin. The rigid state of the surrounding parts, and their disposition to take on the ulcerative process, were circumstances unfavourable to the success of an operation; but as the patient experienced much difficulty in taking food, and complained of an almost constant dribbling of saliva from her mouth; and, moreover, as she earnestly solicited me to endeavour to relieve her from these inconveniences, I was unwilling that she should leave the Hospital without some attempt being made to remove a defect irremediable by any other means than an operation. In a less diseased state of the surrounding parts, the success might have been greater, but the degree of it was as much as the nature of the case seemed to admit of. The patient has since been able to take her food with much greater ease, and the troublesome flow of saliva over the lips has ceased. No tendency to a return of the ulceration had shown itself at the distance of three months from the time of the operation.

CASE IV. *Destruction of the Eyelids, followed by a singular appearance of the Eyeball.*—Henry Muir, æt. 28, admitted 17th December 1831. The whole forehead is more or less covered with incrustations and cicatrices of previous sores. Commencing at the left superciliary notch, and extending to the external angle of the right orbit, there is a lengthened depression, apparently from an exfoliation of the right superciliary ridge and other neighbouring portions of the *os frontis*. Both eyelids of the right side are completely removed, and the conjunctiva stretches tightly over from the upper margin of the orbit, to which it is firmly connected, to the lower, being there continuous with the integument of the cheek, as it is above, with those of the forehead.

The conjunctiva is in a thickened state generally, and that portion internal to the cornea is partly in a granulated condition. The cornea is opaque, and appears as if a thickened and partly corrugated membrane extended over it. Within the external angle of the *os frontis* there is a small patch of red membrane, with some ulcerated points, through which a limpid fluid, like tears, sometimes copiously exudes. A considerable part of the conjunctiva appears superficially ulcerated. No traces of the *puncta lacrymalia* can be discovered. He is only sensible of a very strong light, as that produced by placing a lighted candle very close to the eyeball. The eyeball moves in the orbit to a limited extent, its motions being retarded by the tense state of the conjunctiva.

The prepuce has also been entirely destroyed by ulceration, leaving the *glans penis* uncovered. There is an ulcer, with undermined edges, encircling the root of the penis, and another situated on the under part of the penis near to the glans, where a small opening communicates with the urethra, allowing a great part of the urine to escape by it. An ulcer of a similar character is also observed upon the nates.

No satisfactory account can be obtained of the history of the case; but it is believed that he had been affected with syphilitic ulcers, and he admits having taken mercury to a considerable extent.

Observations.—Instances of a partial destruction of the eyelids have sometimes been met with in practice, but I am not aware of any example having been recorded in which both eyelids of the same side had been wholly removed by ulceration, leaving the eyeball altogether exposed, and presenting the singular appearance observed in the present case. From the eyeball being deprived of its natural covering, and left constantly exposed to the contact of the air and the irritation of extraneous bodies, the usual changes have taken place here which are observed to happen to a more limited extent in certain cases of *ectropium* and *staphyloma*, viz. a thickened condition of the *conjunctiva*, and an opaque state of the *cornea.*—(Plate II. Fig. 3.)

When the patient was admitted into the hospital, a considerable part of the sclerotic conjunctiva presented a raw surface; but after the use of an astringent lotion for some time, it became covered with a thin film or pellicle of new cuticle, excepting two very limited portions at the inner and outer angles of the eye.

At the outer angle of the eye, a little below the situation of the lacrymal gland, the tears are seen exuding from very minute and nearly invisible orifices, at two separate places, a little distant from each other, where they collect in globules and then trickle down the cheek. At the inner canthus, a little clear fluid is sometimes seen resting upon the surface, which it is conjectured may come from the lacrymal sac, if this be not yet obliterated. (See Plate II. Fig. 2.)

The patient suffers neither pain nor inconvenience from the exposed state of the eye.

The ulcers on the genitals having been in a chronic and indolent state, showed little disposition to take on a healthy action; but by putting the patient on a generous diet, and administering nitric acid internally, together with the local application of lunar caustic, followed by solutions of the sulphate of copper and sulphate of zinc to the sores, these were brought into a healing state, and they are now nearly cicatrized.

In cases of carcinomatous affections of the eyelids requiring their removal, surgeons have directed that the eyeball should be extirpated at the same time, in order to save the patient from that extreme degree of suffering supposed to arise from constant exposure of the eyeball; but the present case shows that this state of irritation is not an invariable result of such exposure, since the patient, as already stated, experiences neither pain nor uneasiness at present, nor is he likely to do so in future, as the parts are becoming covered and protected by the formation of a new cuticle over the surface which has been left exposed by the loss of the eyelids.

ART. III.—*Observations on the obstetric operation of* TURNING. By THOMAS RADFORD, Esq. Senior Surgeon to the Manchester Lying-in Hospital and Dispensary for the Diseases of Women and Children.

THE operation of turning is not limited in its application to one case, but is essentially demanded, and affords the only safe means of rescuing the female as well as her offspring from impending danger in a number of accidents occurring during birth. One method, if duly established as the best, will answer in all cases to which this operation is applicable. To show the predicament in which the practice now stands, I shall quote the directions given by the writers most generally and deservedly esteemed in this country, as well as in France and America.

The rules established by Dr Denman may be understood from the following passages.

"If both the feet should be lying together, we must grasp them in our hand; but if they be at a distance from each other, we may commonly deliver with one foot without much additional difficulty; though as in some particular positions we cannot always turn the child, if it be large, by one foot, it is better to make it a general rule to bring down both feet together, when they are in our power."—Dr Denman's Introduction to the Practice of Midwifery, Vol. ii. p. 235.

" The hand is then to be immediately carried into the uterus, and, if we have decided on turning, upwards until the feet be found. Both feet are to be grasped between our fingers, and brought down into the vagina, taking care that the toes be turned to the back of the mother."—Burns' Principles of Midwifery, &c. p. 316.

" Having passed the hand beyond the *cervix*, we carry it on betwixt the body of the child and the surface of the *uterus*, which is felt hard and smooth, from the tonic or permanent action of the fibres, until we reach the feet, both of which, if possible, we seize and bring down; but if we cannot easily find both, one is to be brought down into the *vagina* and retained there. The child will be born with the other folded on the belly."—Idem, p. 367.

" In every turning case you are to introduce your hand by the side of the presenting part; as the feet are brought down this goes up. If both feet cannot be readily grasped and brought down together, bring down one first and then the other."—A Practical Compendium of Midwifery, &c. by the late Dr Gooch, p. 236.

" The established practice," says Dr Merriman, " then, is for the operator to pass his hand into the *uterus*, to take hold of the feet, and bring them without the *os externum*; thus converting the presentation of the arm into a presentation of the feet." —Synopsis, p. 80.

Dr Blundell, after recommending the accoucheur to grasp the feet in any mode he can, proceeds to say,

" If both legs are seized, the child will turn more easily. If you can grasp one leg only, let this be brought down. Often you may turn by one leg; but should it be necessary to draw down the other, the access to the second will be facilitated by the descent of the first. Should the seizure of the leg be impracticable, I would recommend you to lay hold of the knees, gradually working your fingers towards the feet, in the way here demonstrated."—Lancet, Vol. i. p. 551.

The directions of the foreign accoucheurs are much of the same character.

" We hook the feet with the ends of the fingers a little bent, and bring them to the entrance of the vagina, making them pass over the breast and face of the child. When we can take hold of but one foot at once, we must take that which belongs to the side that the hand has passed over, unless it be engaged in the bend of the ham of the other leg, as we sometimes meet with it, for then we must begin by bringing down the foot of that leg first. As soon as we have brought one foot out of the uterus, we must introduce the hand again to search for the other, either by tracing the same course, &c.—Heath's Translation of Baudelocque, Vol. ii. page 208.

" On ne peut pas fixer d'une manière générale la direction que la main doit suivre dans la matrice pour atteindre les pieds. Comme elle varie suivant la situation de l'enfant, je ne puis indiquer le chemin le plus court et le plus facile pour parvenir jusqu'aux pieds que lorsque je traiterai de chaque position en particulier. Lorsque les pieds sont éloignés de l'orifice et pressés dans la matrice, il est necessaire de les entraîner tous les deux. Lorsque les eaux sout écoulées depuis long-temps, on arracherait plutôt le pied que d'amener l'enfant en tirant sur un seul : le plus souvent même on ne peut les extraire que l'un après l'autre. Dans les manœuvres que je vais décrire, je les supposerai toujours tellement serrés ou embarrassés l'un dans l'autre, que l'on ne peut pas les entrainer en même temps."—Gardien, Traité complet d'Accouchemens, &c. Tome ii. p. 443.

" Après avoir reconnu la partie qui se présente, on la refoule pour débarrasser le détroit supérieur, en ayant soin d'appliquer les doigts sur une surface aussi étendue que possible ; puis on va à la recherche des membres, qui l'on saisit pour les ramener à l'orifice."—Velpeau, Traité Elémentaire de l'Art des Accouchemens, &c. Tome ii. p. 709.

" La plupart des accoucheurs ont conseillé et conseillent encore de saisir les pieds, et non pas une autre partie des membres ; les pieds, enfin, sont la seule partie sur laquelle on recommande de tirer dans la version dont il s'agit. Cependant il est possible, il est même avantageuse, dans beaucoup de cas, de suivre le conseil donné d'abord par Burton, reproduit ensuite par M. Delpech, et tout récemment par M. Breen, c'est-á-dire de saisir les genoux ou les jarrets plutôt que les pieds."—Idem, p. 711.

" He should endeavour to pass the hand immediately to that part of the uterus where he expects to find the feet, and this must be determined by the presentation or situation of the child. When the operator has gained the feet, he should, 1*st*, grasp them firmly with the hand, but should always, in doing this, place a finger between them, to prevent injury by compressing them too strongly ; 2*d*, When practicable he always brings both feet along at the same time ; 3*d*, Though sometimes practicable, nay, easy occasionally, to deliver by one foot, it should never be done but from downright necessity, and this can occur but very rarely; *5th*, Should he be able to bring only one foot to the entrance of the vagina, let him secure it by a fillet, while he searches for the other."—Dr Dewee's Compendious System of Midwifery, p. 285.

The foregoing quotations prove that the operation of turning, as at present practised, consists in dilating the *os externum*, *vagina*, and *os uteri*, passing the hand into the *uterus*, searching for one foot, and then for the other, bringing down the feet to the *os externum*, and forthwith extracting the child. If the difficulty is very great in finding both feet, we are then allowed to content ourselves in bringing down one foot only.

The presentations of different parts of the child's body ascertained during labour, before the *os uteri* is dilated, are not all equally safe to the mother or the child. Presentations of the *vertex* are accepted as natural, because they are the most frequent, the most safe, and are capable of being accomplished by the unaided powers of nature. The different presentations of the head constitute varieties, but are nevertheless more safe both to the mother and child than any other. The presentation which ranks the next in point of safety is the breech, after which are placed presentations of the lower extremities. In labours where the trunk, or superior extremities of the child present, the process cannot be completed by the natural powers, except in those rare cases where spontaneous evolution takes place. If the mother were left to her own powers unaided, she would inevitably perish, and also her offspring.

In these cases, therefore, manual assistance becomes necessary. The practice is evidently that of changing the position of the child, so that the natural powers of the mother may accomplish its expulsion, or that it may be delivered by the accoucheur. The means most desirable to adopt in such cases, would be, if possible, to change the presentation to that of the head, this being the safest and most natural. This practice was inculcated and attempted by the older writers, but cannot be put in execution from the inability to seize a body of such magnitude as the child's head, so as to bring it to lie over the *os uteri*. As the breech is the presentation next in point of safety, we might on this account be induced to seize this part to effect a change of position, but the same objections exactly apply to this as to the attempt at bringing down the head. We are therefore reduced to the necessity of adopting the present practice of bringing down the feet. A superficial view of these cases might lead us to the conclusion, that if it were possible to effect a breech presentation, little comparative advantage would be obtained over bringing down the feet. But the results of practice prove, what might be inferred by reasoning, that *the child's life is much more frequently preserved in those cases in which it presents the breech, than where the feet come down first.* The measurement of the child round the hips and thighs, when the latter are turned up towards the belly, as in breech cases, approaches nearly to the circumference of that portion of the head which lies parallel with the pelvic cavity in natural labour. The dilatation of the *os uteri* and *os externum* is effected so completely by the passage of the breech, that very little resistance is offered to the expulsion of the head, or a dexterous extraction of it, if the umbilical chord should show signs of compression hazarding the life of the child. But this is not the case in presentations of the lower extremities; the child in this case descends in a wedge-like form, constantly presenting an increase of measurement in the successive parts of its body; which parts, in comparison with the head, are rather more yielding. At the time the head, which presents the greatest circumference, enters the pelvis, compression of the *funis* takes place, and if the *cervix* and *os uteri* are not sufficiently dilatable, which is most generally the case, especially in first labours, the child will be lost. The attempt to bring the child rapidly through the pelvis has a tendency to increase the opposition by inducing a spasmodic action of the *cervix*, which, coupled with the inadequate dilatability of the *os uteri*, becomes *pro tempore* an insurmountable barrier to the extraction. Is there, then, no practice which would enable us to bring down a part, approximating in its measurements to that of the breech presentation which we have already stated to be so safe to the child, but which cannot be effected? There is, and this practice consists IN NEVER BRINGING DOWN MORE THAN ONE FOOT in the manual operation of TURNING the child.

The propriety of this practice may be shown by considering the greater safety of breech presentations over those of the feet, and comparing the measurements of the breech with the thighs flexed upon the pelvis with that of the head. If, as above stated, we are not able to effect a breech presentation by the hand *in utero;* that operation which produces a presentation possessing a measurement nearest to it is the one we ought to prefer, and this consists in bringing down ONE FOOT only, leaving the other, which would become turned up towards the abdomen of the child, thus producing a presentation compounded of the breech and one lower extremity. The circumference of the hips in this position of the parts varies very little from that of pure breech cases, and must consequently be attended by nearly all the advantages of such a case. In considering this subject, it will be desirable to attend carefully to the subjoined measurements, which have been accurately obtained from children born at the full period of gestation. The circumference of that portion of the head which presents in labour is from 12 to 13½ inches. Do. of the breech with the thighs turned upwards to the belly, as in breech presentations, from 12 to 13½ inches. Do. with one thigh turned up towards the abdomen, the other extended, from 11 to 12½ inches. Do. of the hips, the legs extended as in feet presentations, from 10 to 11½ inches.

These measurements prove several points. 1*st*, That breech cases differ very little in their power to dilate the passages of the mother as extensively as the head, and therefore that whenever the breech passes, we may expect the head to pass with moderate ease, either by the natural efforts or by judicious artificial aid. They also show, *2dly*, That when one thigh is turned up towards the abdomen of the child, that the measurement is very little less than that of the presenting part in pure breech cases, and therefore that we may expect the head to pass with nearly as much ease as in those cases.

3dly, That where both feet are down, the measurement of the hips differs so much from that of the head as to be insufficient to accomplish that dilatation of the soft parts which will allow the head to pass, or be extracted with sufficient celerity to save the child when its life is threatened by the compression of the funis.

The foregoing observations authorize the conclusion, that in undertaking this operation we should make it a positive and invariable rule NEVER TO BRING DOWN MORE THAN ONE FOOT OR ONE KNEE.

Whenever any such circumstances occur during labour, as large hæmorrhages, preternatural presentations, &c. for the relief of which we adopt the practice of turning, the uterus will be found in one or other of the following conditions; either fully distended, the *liquor amnii* not having escaped; or more or less contracted upon the body of the child, the *liquor amnii* having been discharged. In the first class of cases the operation is effected in a short space of time with great ease to the practitioner, and with comparative safety to the mother and the child. In the second class of cases, where the *liquor amnii* has escaped, and the contraction of the uterus is more or less powerful and closely embracing the child, the difficulties and dangers of turning manifest themselves. In these cases we are recommended to bring down *both feet*; but if we find great difficulty in doing so, to content ourselves by bringing down *one foot* only. The interrogatory is naturally suggested by this last sentence, Why? The answer to which is, because it IS MORE

EASY AND MORE SAFE TO BOTH MOTHER AND CHILD TO DO so. In the rules given by authors for the management of these cases, we are restricted to the operation most complex to the practitioner, most difficult to the mother, and most dangerous to the child, for the relief of that class which are of easy accomplishment; whilst we have the option only of adopting the most easy plan in the most serious and difficult cases.

In all cases, when the *liquor amnii* has been discharged, it is our especial duty TO BRING DOWN ONE FOOT ONLY. If but a short time has elapsed since this occurrence, the case will still maintain a favourable aspect, the presenting part will not be wedged in the superior aperture of the pelvis, the uterus will not be powerfully contracted upon the body of the child, and the operation of turning may be accomplished WITH MODERATE FACILITY AND ADDITIONAL SAFETY BY BRINGING DOWN ONLY ONE FOOT.

But when the *liquor amnii* has been long evacuated, the case assumes a different character, the presenting part is wedged firmly in the superior aperture of the pelvis, the uterus is powerfully embracing the body of the child, the *os uteri* is hard, tumefied, and indisposed to dilate. The hand of the operator is impeded by the arm of the child at the *os externum*, and all the parts exposed to the mechanical influence of pressure, have sustained injury from the long-continued but ineffective action. In such cases we *should never contemplate bringing down two feet*, not abandoning this plan, because we cannot find, or cannot secure the second foot, but should make the *principle of our operation* THE BRINGING DOWN ONE FOOT only; and where the contraction of the uterus upon the child's body is so strong as to create a difficulty, we should not *search for the foot*, *provided we can secure and bring down one knee;* for as the knee is brought down, the foot will descend and come within reach, so that it may be seized and brought through the *os uteri* with facility. In such a condition of the organs, it is evident that every rule which has a tendency to lessen irritation and soothe and subdue the morbid sympathies, abundantly excited by the pressure of the child, and the manual movements of the operator, is of the most vital importance to the female. Great caution should be observed in the mode of introducing the hand not only through the *os uteri* but along the vaginal canal; it is also of great consequence to attend to the length of the period during which the hand remains introduced. In accordance with the principles so frequently urged, it will be manifest that the evolution of the child, and the easy recession of the presentation, will be better accomplished by not accumulating too great a bulk upon this part at the *os uteri*. These extreme cases of difficulty in turning are most commonly met with in preternatural presentations neglected in the early stages, and often attendant upon the practice of females. I have never yet met with a case where the *liquor amnii* has been evacuated for more than 24 hours, where the difficulty of turning was not increased by a strong circular band of uterine muscular fibres, which embraced closely and firmly the lower part of the chest and the abdomen of the child, leaving the breech and inferior extremities in a kind of chamber at the fundus; the head, shoulder, and inferior extremities lying beneath, and the presenting part protruding through the *os uteri*, which is partially dilated. The practice before stated I have the more confidence in recommending, as it corresponds with the views of my valued relative Mr Wood, whose opportunities of observation in this department have been most extensive, and such as rarely fall within the sphere of one individual.

I have purposely omitted entering into a detail of the several preliminary measures calculated to facilitate the operation; the rules regulating the choice of the hand; the mode of proceeding to turn; the several steps in the extraction of the child, and also the consideration of the practicability of turning in all cases. These may perhaps form the subject of a future communication.

ART. IV.—*Some Remarks on the Operation of Turning the Fœtus; with the view of showing how it may be performed with the least suffering to the Mother.* By JOHN ROBERTON, Esq. one of the Surgeons to the Manchester Lying-in Hospital and Dispensary for the Diseases of Women and Children.

AS the most valuable triumph which could be achieved for surgery would be the discovery of efficacious substitutes for many of its torturing and mutilating operations, so in the practice of midwifery it is no less desirable to aim at the substitution of gentle and scientific expedients, for what is still unquestionably too prevalent—mere mechanical force. *Turning* is one of the operations which, in my opinion, admits of some amelioration. No obstetrical operation, whether manual or instrumental, is so greatly dreaded by the patient; partly, no doubt, from the danger to which it subjects both her and her offspring; but still more, probably, from the suffering it inflicts. I am far from thinking that turning admits of being performed without risk and pain. If, however, by the mention of a few simple principles, overlooked perhaps rather than unknown, I should succeed in showing in what manner the risk and the pain may be in some degree lessened, I shall be well satisfied, even although my suggestions should not be admitted to rank as novelties. It being no part of my plan in this paper to furnish a general treatise on turning, the reader will not expect me so much as to allude to many of the difficulties and modes of proceeding incident to the operation. I shall confine myself rather to an attempt to show how we are to obtain a favourable condition of the parts, as preparatory to turning; and then, this step having been gained, how we may, with most facility, carry the hand up to the feet of the fœtus.

It may be proper for me to remind the reader that the entrance of the *vagina* is guarded by two strong muscles, the course and action of which ought to be well understood. *First*, the *levator ani*, which may be said to line the pelvis, arises inside of the *pubis*, not directly in front, but rather, towards the thyroid aperture; from all the upper edge of that aperture, and all the way back to the spine of the *ischium*, its strong tendinous fibres descend on each side to the perineum and *anus*, like two strong bands contrived to hold up the contents of the pelvis. Such being its origin, the muscle of course does not surround the *vagina;* for in sweeping down from the *pubis*, it forms a semicircular opening, in which the vagina rests, the fibres of the muscle embracing it underneath and laterally, but not above. The action of the *levator ani*, as regards the vagina, must be to raise it upwards in the direction of the arch of the pubis, and at the same time assist the *sphincter vaginæ* in compressing it at the orifice. This latter muscle, the *sphincter vaginæ*, is often of considerable size. It arises from the *sphincter ani*, and completely encircles the vagina at its orifice, and to some extent inward. Like all the other sphincters, it possesses great aptitude for contraction; in a word, great irritability. No one who has had frequent occasion to carry his hand into the uterus, can be ignorant of the power of these two muscles in resisting, under certain circumstances, the passing of the arm through the *os externum*.

After my hand has reached the body of the child in the operation of turning, I have sometimes felt my fore-arm powerfully arrested by their grasp, and for a moment paralyzed. This is an occurrence, indeed, which in some cases considerably impedes the operation, by rendering it no easy matter to reach the feet of the child, even after the hand has been fairly admitted within the womb. Again, should the accoucheur withdraw his hand during the operation, he will find, in attempting to re-introduce it, that, although in the outset he may have passed the hand through the *os externum* without resistance, these muscles are now irritated to action; and he will generally experience from them a powerful opposition.

The *vagina* itself, although its muscular fibres are so indistinct as scarcely to be visible, evinces considerable contractile power. This we see exemplified in various ways. In using the common conical *speculum vaginæ*,—an instrument which produces some degree of painful distension, I have been struck with the effort made by the *vagina* to resist its introduction, as well as to expel it after it was introduced. So much has this been the case, that steady pressure has been required to keep the farther orifice of the instrument in contact with the *os uteri* during the brief period of making an examination. The same power is frequently exemplified in the expulsion of the placenta. When the *uterus* has separated the secundines, and thrown them forward into the *vagina*, their expulsion (and it sometimes takes place with considerable force,) is not the *unaided* work of the *uterus*, but is effected thus;—the *uterus*, empty and contracted though it be, contracts still more, to a very small bulk, and descends completely into the pelvis, for the performance of its only remaining duty; consentaneously with its descent, the *vagina* contracts; and this twofold action, pressure from above and contraction laterally, ejects the burden.

It has sometimes been said that there are no muscular fibres discoverable in the *cervix uteri*. If this be true in anatomy, it is false in physiology. The contractile power of this part does not admit of dispute. It is the circular contraction of the *cervix*, which occasionally forms an almost insuperable barrier against the entrance of the hand into the uterine cavity in turning; and when the hand has found admission, benumbs it, by the strength and vivacity of its action. On attempting to pass the hand into the womb, I have known the upper part of the *cervix* assume a state which gave the impression to the touch as if it had been a firm thick ring, so greatly was it contracted. Sometimes also after the child has been turned, and the body delivered, the head is spasmodically retained within the *uterus*, solely by the circular contraction of the *cervix*.

During labour, a remarkable sympathy exists between the *os externum* and the *uterus*. This is proved by various facts. For example, in what is called suspended labour, the head of the fœtus sometimes rests for 10 or 12 hours on the *perineum*, owing to the absence of uterine pains; but no sooner is the *vertex* made to advance in the direction of the outlet, by means of the forceps, so as painfully to distend the *os externum*, than the *uterus* almost uniformly begins to act, often indeed, so promptly as to render farther traction unnecessary. Again, in extracting the placenta, or in removing clots from the uterine cavity, although the womb should be flabby and indisposed to contract, even under the employment of stimulants, and friction to the abdomen; yet in carrying the hand through the *os externum* we generally find that there is some degree of uterine action excited on the instant, not always regular expulsive contraction, it may be, but such action as proves that this sympathy exists. A still stronger instance, to the same purpose, is furnished by what may be observed in drawing away the *placenta* when it lies detached in the *vagina*. On passing the finger along the cord, we discover the smooth convex surface of the placenta just within the orifice; we pull at the cord, and thereby bring the bulk of the *placenta* to distend the *os externum:* its expulsion instantly follows.*

The foregoing facts, which are derived from personal observation, suggest among other inferences the following important one; that as it is always desirable to secure an *inactive* condition of the *uterus,* whenever the position of the fœtus within its cavity requires to be altered, so when this inactivity has been obtained, it is necessary, in order to its continuance during the operation, that *the introduction of the operator's hand should be managed in such a manner as not to irritate, nor painfully distend, the vagina and os uteri.* It is very true that an inactive state of the uterus, when turning is necessary, is often difficult to be secured in the degree which may be desirable; much, however, for this end may be effected, by proper means, but our success in securing a cessation of uterine action will be in a measure in vain, unless we succeed in soothing and relaxing the passage which conducts from the vulva to the cavity of the womb; particularly those two parts of it, the *os externum* and the *os uteri.*

In illustration of these principles, I shall suppose an ordinary case, where some part of the upper extremity of the fœtus is found presenting, the membranes being ruptured, the *os uteri* partially open, and regular uterine action established. What, in these circumstances, ought the practitioner to do, in order that he may turn with the least possible suffering to the mother, and with safety to both mother and child, before the uterus has firmly embraced the bulk of the fœtus, and also forced the shoulder low in the pelvis? Three indications require his attention. *Firstly*, To suspend or allay uterine action. *Secondly*, To render the *os uteri* dilatable if need be. And *thirdly*, To prepare the vagina for the ready admission of his hand and arm.

---

* Ignorant midwives sometimes attempt to avail themselves of this sympathy, to the great injury of their patients. These practitioners are in the habit of "giving help," as they term it, by thrusting their fingers into the vagina, on the accession of a pain, and forcibly pulling back the perineum. This they believe furthers labour. That such a practice will frequently excite or increase uterine action, (seldom the regular labour pains,) I have certainly had reason to believe. But the consequences are bad, often of the very worst kind. In one instance, that of a healthy young woman, who had been three days in labour, under the hands of an ignorant midwife, I found the perineum and recto-vaginal septum in a state of gangrene, caused solely by her persevering and merciless efforts to "give help." This deplorable condition of the parts was witnessed by my friend and colleague Mr Fawdington, with whose assistance I was favoured in effecting the delivery.

In regard to the first indication, I know of no means superior to those, which I believe are recommended by several writers of note, venesection and laudanum. During many years I have had recourse to these, and with advantage. When the patient is vigorous, and the uterus in lively action, (it is only in these circumstances bleeding is advisable,) I am in the habit of abstracting from twelve to twenty ounces of blood; and afterwards of administering from fifty to seventy drops of laudanum. The blood should flow when the patient is in a sitting posture, that some degree of faintness may be produced; the operator ought then, having given the laudanum, to wait a quarter of an hour for its full effect before proceeding to turn. Indeed, the period of delay must be somewhat regulated by the condition of the *os uteri*, as hinted in stating the second indication.

It, however, fortunately happens, that the same means which allay uterine action, generally render the *os uteri* dilatable. Meanwhile he need not be idle. He ought to be attending to the third indication, and *this* is to be done by a regard to the following particulars. The patient reclines, I shall suppose, as is usual, on her left side. She is to be moved so as to lie directly across the bed, with the nates projecting over the edge of the mattress.

His next duty is to introduce, in the gentlest manner, into the *vagina* portions of fresh lard, sufficient to stuff it moderately. As it rarely happens when turning is required that the vagina is lubricated with the natural mucus, it has generally been recommended that the surgeon should anoint his hand and arm previous to operating; but this practice, where the hand has to be maintained *within* the uterus for several minutes, often much longer, besides, perhaps, having for a considerable time to be moved about in the vagina in dilating the *os uteri*, will be found of little avail as a means of lessening friction, compared with that furnished by a copious lubrication of half melted lard. Unless the passage be thus protected, the action of the operator's fore-arm within the vagina corresponding to the motions of his hand and fingers within the womb, generally, I might almost say uniformly, gives rise to spasmodic action of the *sphincter vaginæ* muscle, to uterine contractions, and bearing-down efforts on the part of the patient. I was first made aware of the great utility of this mode of proceeding as preparatory to turning, by a case which I will briefly relate.

My assistance was requested by a midwife in a twin birth, where twenty-three hours had elapsed without the expulsion of the second child. After the first birth there had been no return of labour-pains. The woman, I found, was feverish; the vagina remarkably dry and hot, and so tender, that it was with no small ado I was even permitted to make my examination. Thinking it high time the labour should be terminated, I was compelled to fall upon some expedient by which the introduction of my hand into the uterus, and the extraction of the child, might be rendered endurable to the patient. It occurred to me that this could only be effected by *free lubrication* of the vagina. I accordingly stuffed it with lard, which the heat of the parts soon melted. The result more than answered my expectation. The passing of the hand, and the delivery of the child, which was alive, were attended with comparatively little pain or difficulty—a consequence I could not but attribute *solely* to the soothing and relaxing effects of the unguent.

In turning, which of his hands ought the operator to employ? This is a question of some importance. That hand, in my opinion, which corresponds to the side of the body on which the patient is lying. The patient lies, I have supposed, on her left side; the operator should therefore use his left hand, because with it *only* can he operate, and at the same time maintain a proper regard to the axes of the passage. After anointing his left arm, he sits down behind his patient, and folding the fingers and thumb together in the form of a cone, he slowly and gently passes the hand in the axis of the outlet until the wrist is embraced by the *os externum*, when the sense of distension and pain, if there has been such, ceases. In this manner, the hand may be introduced with very little suffering to the patient, but in no other, without in general causing acute pain, spasmodic action of the passage, and bearing-down efforts. When the right hand is used, the position of the patient being what I have stated, the moment it has passed, the flexures of the wrist and the palm are found not to correspond with the axis of the *uterus*. To obviate this the fore-arm has to be forcibly depressed against the perineum,—an effort that not only gives the patient much pain, but also excites, except in very tranquil relaxed subjects, the powerful opposition of the *levator ani*, which strives to carry the arm into its first position, that is, into the axis of the outlet. Moreover, whoever has practised with the right hand cannot have failed to remark, how difficult it is even after the hand is in the uterus, if the uterine action be powerful, to turn the palm towards the child so as to grasp any part of it. Occasionally, too, there is difficulty in passing the right hand sufficiently high to reach the feet; for, in carrying the hand onwards in the womb, he necessarily strives to bring the fore-arm as nearly as possible in a line with the hand,—a manœuvre generally opposed, as I before mentioned, by the *levator ani.* In operating with the left hand, it is obvious that very few of these difficulties will be experienced. It is true, when the feet of the fœtus lie in the anterior part of the womb, which is known by the palm of the presenting hand being towards the abdomen of the mother, the operator may have slight difficulty, especially if there be much uterine action, in turning round his left hand to grasp the feet. In practice, however, I have found *this* more a hypothetical than a real difficulty.

ART. V.—*On the Identity of Cow-Pox and Small-Pox.* By GEORGE PLAYNE, Esq. Member of the Royal College of Surgeons in London, and House Surgeon to the Gloucester General Infirmary.

IN the last number of the Edinburgh Medical and Surgical Journal, (October,) there are recorded some highly interesting and important experiments by Dr Sonderland of Bremen, in illustration of the doctrine of the identity of small-pox and cow-pox. If our confidence in the protecting power of the latter had required the last proof which these experiments afford, the publication of their successful results must be gratifying to every humane mind; while their demonstration of the soundness of the pathological doctrines of the immortal discoverer of vaccination, as unfolded, and followed to their conclusion by Dr Baron, in his able biography of Jenner, must be no less gratifying to the medical philosopher, and to all who take an interest in the speculations of genius, or in the exposition of the process by which the slower operations of the intellect become productive of fruits of the greatest utility to mankind. But I confess I was astonished to perceive these experiments introduced to the notice of the medical public of Britain as the "most important discovery which has been made in the pathology of these diseases, (small-pox and cow-pox,) since vaccination was first introduced; by showing that they are modifications of one another, and that cow-pox in the cow is simply small-pox in man." I can have no wish to detract from the just praise which is due to Dr Sonderland for these experiments; as a foreigner, he may have been unacquainted with the previous promulgation of the doctrine they elucidate, though it is more probable they were instituted for the purpose of completing its already established proofs. Indeed he appears to confine his own claims to the merit of being the first to ascertain "the possibility of transmitting the contagion to the cow *in a gaseous form.*" It is, however, but an act of common justice, an acknowledgment due from every lover of truth, to declare that the doctrine thus announced as a discovery was promulgated four years ago in the account of the life and writings of Jenner by Dr Baron. It forms a prominent feature of that work, and entire chapters of the book are devoted to illustrate and confirm it. It was a subject of some surprise to me, that at a time when it was notorious that the confidence of many medical men, and of a large portion of the public, in the protecting influence of vaccination, was somewhat abating, more attention was not bestowed on this illustration of the subject; but now that it has been again presented to the medical world through the medium of these pages, it will not be uninteresting, I think, to recur to the proofs that were originally urged in its support. It will then appear how the experiments and inferences of Dr Sonderland follow as a clear and distinct corollary from the positions of Dr Baron, and the whole matter will be seen to rest on a basis that cannot be shaken.

I would refer the reader more especially to the 5th, 6th, 7th, and 8th chapters of the Life of Jenner by Dr Baron. The author having stated, that Dr Jenner "always considered small-pox and cow-pox as modifications of the same distemper; that in employing vaccine lymph we only made use of means to impregnate the constitution with the disease in its mildest, instead of propagating it in its virulent and contagious form, as is done when small-pox is inoculated; and that the name which he gave to the former sufficiently and strongly indicates his sentiments on that head," acquaints us that he is about to relate a series of facts which lead irresistibly to the conclusion,

First, "That an eruptive disease *common* both to man and to the inferior animals has been known in different ages and in different countries, and that the description given of this eruptive disease by various writers, accord so completely with those acknowledged to be characteristic of small-pox, as to render it highly probable that this disease actually existed at a much earlier period than that usually assigned to its origin."

Secondly, "That as there are numberless writers who have described the small-pox in man, so there are others of established name and reputation who have treated of a similar eruptive and pestilential disease as existing in various countries, and in different times, among the inferior animals, but especially among cattle; that to this disease they have unhesitatingly applied the name of *variola*, and actually recommended such treatment as experience had proved to be useful when that disease attacks man."

He then adds, " Should these propositions be established, they will go far to prove that the *variolæ* of man and of the inferior animals are essentially and originally the same, and that from their first appearance to the present hour, they have existed under various modifications. I am prepared to expect opposition to the opinion respecting their simultaneous origin ; but whatever sentiments may be entertained on that subject, the facts connected with it are well worthy of consideration, and can scarcely fail to give a degree of confidence in the inoculation for the *variolæ vaccinæ* which that practice, unfortunately for mankind, has not yet acquired."

In illustration of the first proposition, namely, of the great antiquity of small-pox, and its occasionally simultaneous occurrence in man and the inferior animals, a large mass of evidence is collected from the writings of historians of almost every age, down to the period when small-pox is on all hands admitted to have existed. To quote these evidences, interesting and satisfactory as they are, would swell this paper to an immoderate length ; but the result of the examination is irresistible.

Dr Baron next proceeds " to prove from the direct testimony of those who have written expressly on the disease of cattle, that an epidemic small-pox, *described under that specific name*, has been often known to have raged amongst them." This part of the subject, admitting of more distinct evidence, being drawn from medical writers solely, and from more recent periods, when greater accuracy in describing and discriminating diseases had obtained, is accordingly developed in the most clear and satisfactory way, and can leave no doubt in the minds of the most scrupulous. LANCISI, in his Treatise *de Bovilla peste*, describes an epizootic malady which raged in Italy in 1713. He contends that it was precisely a disease such as had been described by Fracastorius two centuries before—a disease, he says, therefore not unknown to our ancestors—and his own conception of its nature cannot be mistaken from his words. " Nonne illam in omnium oculis ponunt et tabe ad cutem depositâ depilatæ, et horror pilorum, et armorum, cluniumque tremor, maculis, denique et pustulis infecta cutis ? Adeo ut quibusdam in mentem venerit cogitare boves non lue, ut nunc res est, sed *ipsis pustulis*, quas *variolas* vocant, interire."

RAMMAZINI describes a similar pestilence which he witnessed among cattle in the year 1690. He treats of it expressly as VARIOLÆ ; and I cannot resist transcribing one of the many striking passages from this writer which Dr Baron has given. " Tubercula autem illa quæ in capite, collo, et cruribus pecudum visebantur, revera *variolas* fuisse licet profecto asserere, quando nec figura, nec colore, nec liquore in illis contento, nec magnitudine, nec modo quo solvebantur post suppurationem, nigra crustâ superstitâ, quicquam a puerorum variolis discrepabant."

But it was in 1711 that the disease raged with such violence and fatality in Italy, and which Rammazini has exerted his best powers to describe. His detail of the symptoms, as given in Dr Baron's translation of the passage, is very striking. "The kind of affection which seemed to have declared exterminating war on the whole race of oxen, was evidently a malignant, destructive, and (if you will) a pestilential fever, commencing with chills, rigor, and *horripilatio*, succeeded quickly by pungent violent heat diffused over the whole body, with frequency of pulse, and accompanied by great anxiety and heavy panting, together with stertor, and in the commencement of the fever with stupor and a kind of lethargy ; a continual flow of stinking matter from the mouth and nostrils ; a most fœtid discharge from the bowels, and this at times bloody ; loss of appetite ; and rumination was altogether destroyed. On the fifth or sixth day pustules broke out over the whole body of the animal, and tubercles resembling *variolæ* in kind and appearance ; death common to all, and in the same manner, about the fifth or seventh day ; very few escaped, and these rather by chance than the efficacy of any remedies." In the year 1730, the occurrence of the pestilence is again described by Goelicke ;* and his account of the general symptoms closely resembles that of preceding authors. He infers, that the distemper was of the same kind in the various places where it occurred ; that it was propagated by contagion ; and that it possessed the property of rendering the animals which had recovered from it exempt from future attacks.

In the Philosophical Transactions for the year 1780, there is a description by Dr Layard of a similar distemper. "The disease," he says, "among horned cattle is an eruptive fever of the variolous kind. It bears all the characteristic symptoms, crisis, and event of the *small-pox* ; and whether received by contagion or by inoculation, has the same appearances, stages, and determination, *except more favourable* by inoculation, and with this distinctive and decisive property, that a beast having once had the sickness, naturally or artificially, never has it a second time."

I have glanced very slightly at the evidence adduced ; but let me add Dr Baron's summary of the whole. "From the preceding facts, it is impossible to doubt that some of the inferior animals, as well as man, have been liable to small-pox in some of its worst forms. The result of Dr Layard's experiments by inoculation has given an interest and a confirmation to this truth, which greatly increases its value. Had the disease which he observed in cattle been of a mild instead of a malignant nature, and had he attempted to communicate it to man by inoculation, he might perhaps have anticipated the great discovery which I am commemorating in the life of Jenner. He has at all events proved that the disease was communicable from one animal to another by inoculation, and that it was thereby rendered milder. When Dr Layard wrote, it was of less importance than it now is to illustrate the connection between the diseases of man and the inferior animals; no trials, therefore, were made to ascertain whether the *variolæ* of man could be communicated to the brute, or *vice versa.* The discovery of *variolæ vaccinæ* has fully established the latter point; and although attempts to demonstrate the former have failed in the hands of some, other investigators have been found more successful." The experiments of Dr Sonderland verify these anticipations and form the concluding link of the chain.

---

* De Lue Contagiosa, 1730.

It cannot, however, have escaped the notice of the readers of Dr Baron's work, that if the historians quoted be accurate in their descriptions, the opinion of Dr Sonderland, that the origin of the disease in cattle is *exclusively* by contagion from man, does not appear to be correct. Many of the authors quoted by Dr Baron describe the disease as simultaneously breaking out among man and beast; in the year 1690 it is recorded by Rammazini that it was first seen among the inferior animals, and that the human species were afterwards affected by it with unmitigated virulence. It is clear, too, from the preceding extracts and similar evidence quoted from other authors in Dr Baron's work, that the disease among cattle is not always of the mild character which Dr Sonderland in his Aphorisms seems to imply. In the county of Gloucester its attacks have been fatal among cattle within a recent period.* The farmers invariably separate the affected animal from the rest of the herd, and the hands and arms of the milkers suffer severely. Finally, it is worthy of observation, that in the different parts of Europe in which cow-pox has been recently found among the herds, it has been invariably traced to the remains of former epizootic pestilence.

Gloucester, *Dec.* 2, 1831.

---

* At Dursley in May 1825. Vid. Life of Jenner, p. 351.

ART. VI.—*Cases in Surgery.* By ROBERT LOGAN, Esq. Surgeon, Lanark, and Medical Officer to the Establishment at New Lanark.

1. LUXATION *of the shoulder-joint reduced with unusual facility.*—T. H., æt. 34. His left shoulder was luxated by the shaft of a cart falling upon it. He showed himself at the dispensary within a minute after the occurrence of the accident. On examination the nature of the accident was evident to the eye, for instead of the natural rounding of the shoulder there was a cavity under the acromion process of size sufficient to have received an egg, and the head of the bone was distinctly felt in the axilla. He could make lateral motion forward and backward, but could not raise his arm. I went out for the purpose of giving directions for its reduction, and returned in a quarter of an hour, when, to my surprise, I was informed it was reduced during my absence. Mr Cassels, my intelligent assistant, in raising the arm a few inches by the hand, felt the bone slip into its position with a sudden jerk, but receiving no assistance from him beyond the slight elevation mentioned above. The patient himself observed the sudden alteration which had taken place, and expressed himself quite relieved. There is in this man a preternatural relaxation of the articulations, from which I was led to imagine that the capsular ligament had not been ruptured but merely stretched to the utmost. Considerable swelling arose, accompanied by symptomatic fever, which soon passed off.

2. *Tumour expanding the spinal chord and nerves, without impairing the sensation or motion of the lower extremities.*—I was requested by a brother practitioner to see a newly born infant which had a malformation of the back. On examination it proved to be a *spina bifida* of the most extensive description. When first observed, the tumour had, I was informed, a very vascular appearance in the centre; on the edge it was raised up containing a clear watery fluid, enveloped by a very fine pellucid membrane; the vascular appearance in the centre soon after birth became of a dark purple hue, which remained two days. The surface of the tumour then assumed a sloughy appearance with evident loss of vitality; but the borders were still transparent, through which, at the lower part, the nerves could be distinctly seen passing down in separate bundles towards the outside of the sacrum. Spontaneous rupture took place, and death followed in a few hours on the 4th day.

Leave being granted to examine the body, a crucial incision was made through the membranes enveloping the tumour, and the flaps dissected back. The whole posterior part of the vertebral canal, from the second dorsal *vertebra* downwards, was wanting. The surface being cleaned, the centre presented an oval mass of a striated fibrous texture, and of a dark purple colour. It was a substitute for the spinal chord, imbedded in cellular substance, which seemed to have taken on a high degree of inflammatory action, every part of it being ramified with enlarged capillary vessels, from which a quantity of florid blood was squeezed by the handle of the scalpel.

Nature had already begun a process for securing and strengthening this most essential part by the deposition of a thick layer of coagulable lymph round its edges, not yet organized. The spinal column maintained its integrity as far down as the second dorsal *vertebra*; it then degenerated into the mass of nervous substance above described. The osseous fossa, within which this collection of nerves reposed, was from an inch to two inches in width, and lined with a strong tunic, which sent a septum firmly attaching it to the bottom of the hollow throughout its whole length. This tunic was pierced with holes corresponding with others in the bony canal at the junction of each vertebra for the exit of vessels, and for the admission of the intercostal and lumbar nerves. Immediately outside of this tunic, on each side of the spine, there was formed a series of ganglions of a perfectly spherical shape, and about half the size of a garden pea, into which two nervous bundles were seen to pass, separated from each other by the space of a line, and lying in the same plane. It is evident that these must have been the nerves of sensation and of volition of C. Bell; but, from the irregularity of their origin, it was impossible to trace them. At the promontory of the sacrum the nervous bundles were united in a more regular manner, which again underwent subdivision, and were distributed into the holes of the sacrum. The aorta and *venæ cavæ* were in their usual situation; the kidneys and other viscera of the abdomen were in a natural state. I regret that want of time prevented any examination of the head; but it was well formed, presenting no hydrocephalic symptoms, and the child seemed otherwise in a healthy condition. From such an extensive malformation, paralysis of the lower extremities might have been expected; but it passed its urine and fæces naturally, and when slight pressure was exerted on the tumour, it moved its limbs with tolerable activity.

3. ***Rupture of the recto-abdominal fascia, exposing the abdominal cavity, yet admitting of delivery terminating favourably.*** —Mrs W., æt. 34. About the fourth month of pregnancy, she stated that, from a protracted and severe labour in bearing her last child, she had ruptured her abdomen. On examination, I found that the *linea alba* had been ruptured from the

pubes to within two inches of the xiphoid cartilage. As nothing but the thin integuments intervened betwixt the hand and abdominal organs, it could be readily passed within its walls. The aorta could be distinctly traced, and the *uterus* and other organs recognized. She laboured under great apprehensions regarding the result of her pregnancy. I recommended to her a broad bandage, which covered the whole of the abdomen, and ending in an obtuse point at the pubes, from which a strap passed betwixt the thighs, and secured at the back, thus affording artificial support in room of the muscles, which had fallen considerably to either side. When labour commenced, the limbs of the infant could be easily traced through the chasm during the intervals of uterine contraction. By the adaptation of a broad bandage, tightened as the labour proceeded, she was enabled to bear her child with tolerable ease in less than twelve hours after the commencement of her illness. The expulsion of the secundines followed in a few minutes afterwards; and she has since done well.

4. *Probable ossification of the umbilical chord causing hemorrhage.*—In a case which lately came under my observation, I had occasion to remark a preternatural fragility of the *funis*, which, as far as I can recollect, has not been noticed by any obstetric writer. It occurred in a woman of a weak leucophlegmatic temperament. The *funis* was remarkably short and thick. In tying it previous to the separation of the infant, I was under the necessity of using great precaution, as the smallest degree of undue pressure caused a rupture of the vessels, giving origin to hemorrhage from the infant; indeed, I was obliged to shift the ligature more than once; and in pulling at the chord, in order to assist the expulsion of the placenta from the vagina, it gave way several times. On examination, it appeared of a cartilaginous structure. Query, Might not this state of the parts give rise to serious hemorrhage and death of the child, from any undue pressure during labour?

5. *Tumour of the pharynx in an infant causing violent dyspnœa threatening suffocation, successfully removed by ligature.*—A child, æt. 3 weeks, had since birth been affected with a difficulty of respiration, which produced a croaking noise something similar to that in croup. The infant kept its mouth constantly open, with the tongue retracted, and the point elevated towards the palate. Its colour, when the fits of dyspnœa were most violent, was of a purple hue, and it could not suck without great risk of suffocation. Indeed, from its inability to obtain its natural food, it had undergone a considerable degree of emaciation. On 16th August its mother brought the child to me, and said that she had observed it vomit something red, which filled its mouth, but that it had been immediately swal-

lowed. I was inclined to laugh at the story, especially after examining the child's mouth, when nothing extraordinary was to be seen. By way of experiment, however, I tickled the fauces, so as to induce the action of vomiting, when it brought up, to my great surprise, a tumour three inches in length, and one and a-half inches in circumference. Whenever my finger was removed from the mouth it was again swallowed, and the croaking noise recommenced, followed by a considerable discharge of frothy mucus. It was with difficulty that a part of the base of the tumour could be seen, even by depressing the tongue, on account of its deep attachment in the fauces. In its natural situation it occupied the centre of the upper part of the pharynx, having the uvula in front. Its base was of a considerable breadth, as far as could be judged. On the following day, having induced the child to vomit up the tumour, the apex was secured and retained by a *tenaculum;* a single loop of dentists' silk was then passed through a double *cannula*, and drawn pretty firmly, after which another was passed to complete the knot; the ends were then cut away, and the tumour swallowed. Next day the tumour was again brought up; but, from the maceration in the mouth, and perhaps the inaccuracy of the application of the ligature, it had slipped. Another single noose was therefore passed over the tumour, tightened by the *cannula*, and fastened to one of its eyes. The *cannula* was then retained in the mouth till the circulation was impeded, the ligature being from time to time tightened. The tumour was then cut away by the scissors close to the ligature, and the *cannula* removed. The child breathed quite freely during the whole time the tumour was in the mouth, and was fed with its mother's milk, which it greedily swallowed from a spoon.

I was obliged to adopt the awkward mode of operating by the *cannula*, as I did not deem it safe to excise so large a tumour in an infant of such a tender age, and where the difficulty of any remedial application must have been insurmountable; because I concluded that the vessels which fed the tumour must have been of such a size as (when assisted by the warmth and moisture of the mouth) to warrant apprehension of danger. Nor do I conceive that torsion could have here been applied with safety, on account of its broad attachment, as it might have brought away a large portion of the mucous membrane lining the fauces, and done irreparable damage. The base of the tumour now presents a small button-like projection, which does not in the least interfere with the function of the epiglottis. The child is now quite well, and has gained flesh considerably.

The preparation of the tumour I presented to the Royal College of Surgeons of Edinburgh.

ART. VII.—*On the Medicinal Effects of the Salts of Morphia, especially the Muriate, with a new mode of preparing it.*

By MONTGOMERY ROBERTSON, M. D. F. R. S. E. Fellow of the Royal College of Physicians, Licentiate of the Royal College of Surgeons, and one of the Physicians to the Royal Public Dispensary, Edinburgh.

THERE are no remedies more grateful to the patient, or more valuable to the physician, than those which enable him to relieve bodily pain, or to alleviate mental distress; and opium, whether we regard intensity of power, or extent of useful application, may be justly esteemed the most important of this class. But as the crude drug contains various ingredients, some of which cause its administration under any form to be accompanied with inconveniences, which, in certain states of body, amount to a sum of evil greater than that it is intended to remove; it might reasonably have been expected, that the discovery and separation of the constituent, in which its salutary virtues only reside; would long since have proved an universal blessing, and extended to every sufferer the benefit of its invaluable qualities. Yet, though fifteen years have now passed since Sertuerner succeeded in directing the attention of chemists to the principle which he named morphia, and though nearly the same period has elapsed since Magendie proclaimed the medicinal virtues of its acetate and sulphate, they have made small progress in the estimation of the British practitioner, and even now enter but seldom into his ordinary prescriptions.

This indifference to what seems a valuable remedy, arises from a cause which has obscured the merits of many valuable remedies,—the uncertainty attending all its preparations; owing to the expence, and the imperfection, of every process hitherto employed for manufacturing them.

Nothing is more fatal to the rising reputation of a potent medicine, than a want of uniformity in its powers or its effects. Resorted to under circumstances of mental distress or bodily torture, if it disappoint the excited expectations, and alarm by its power, or disgust by its inactivity, it sinks at once into disrepute;—neglected by those averse to innovation,—slighted by those jealous of its pretensions,—condemned by those fearful of its success,—and denounced by the many who love better to declare their opinions loudly, than to form them wisely. To secure, therefore, the success of a new remedy, pains should be taken to render its preparation simple and economical, ere the attention of the public be drawn to its worth, and a demand excite the cupidity of the ignorant. Let it then be presented to the public in a state of purity, so that a correct estimate being once formed of its powers, any subsequent failure may be ascribed to its true source,—the carelessness of the manufacturer, or the knavery of the vender.

The alkaloid of opium, in its uncombined state, was, on account of its insolubility, soon disregarded. The acetate was observed to produce, very often, the headach, brown tongue, and disturbed sleep, attendant on opium and its ordinary preparations; over which, in fact, it seemed to have little superiority: and practitioners, hastily ascribing these disadvantages to qualities inherent in morphia, not to impurities,—included all its salts under the sentence of condemnation.

After the confidence of the public was thus thoroughly shaken, in vain did some intelligent chemists endeavour to revive the reputation of the medicine; and, by novel and ingenious, but still expensive and imperfect, processes, to produce and circulate a better and purer article. Their exertions have served only to render the difference between good and bad more striking; they have neither lessened the confusion of results, nor diminished the distrust of physicians. The amendment to be effectual must be universal; and a process to be generally followed must unite purity with economy. To separate morphia from the ever-varying quantity of inert matter with which, along with narcotine, and in combination with meconic and *pectic* acids, it is intimately mixed; and to purify it from a dark resin which adheres to it with much pertinacity; has been the object of many processes, and engaged the attention of many distinguished chemists. But no mode has been suggested at once cheap and effectual. Competition arose; the careless and the ignorant became more intent on quantity than on quality; adulteration was added to imperfect preparation; and now, much that is sold in Britain as pure acetate of morphia, contains more that is inert or deleterious, than salutary and active. *

In Germany Merk and Geiger, † and very recently Robiquet in France, ‡ declared that they had detected narcotine in the morphia obtained by the ordinary processes; and this impurity in their base is, from the peculiar manner in which they are prepared, easily communicated to the salts. Chemists take more pains to deprive them of colour than of narcotine,—a crystalline principle which, though recent experiment proves it to be less noxious than is generally imagined, must weaken the power, and modify the properties of the preparation into whose composition it enters; as it differs widely from morphia both in energy and effect.

---

* See Dr Gregory's paper in No. 107 of Edin. Med. and Surg. Journal.

† By the direct experiments of Merk, all the morphia and its acetate of commerce contains more than two-thirds of its weight of narcotine.—(Geiger's Magazine, February 1826.)

Geiger and Trautwein confess, that what they had considered to be pure morphia consists rather of narcotine only.—(Geiger's Mag. xvii. page 342, and xix. p. 153.)

‡ Robiquet (whose process is that ordinarily pursued in France) owns that he has been made sensible lately that his morphia, prepared with the greatest care, contained a considerable quantity of narcotine; which he was far from suspecting previously.—(Journal de Pharmacie, November 1831, p. 638.)

The acetate is, moreover, a most injudicious combination, being liable to uncertainty from other sources besides mere impurity. To obtain it solid, it must be evaporated to dryness, and consequently it varies in the quantity of acid it contains. * Extremely deliquescent, it attracts moisture from the air, and is apt to increase in weight, but decrease in energy. By the contact of water it is decomposed, the most active portion being insoluble. Hence it is found not so deadly a poison as it was at first thought to be; and an instance occurred not long since at Paris, of a young man bent on self-destruction, swallowing twenty-four grains at once without effecting his purpose; though no assistance was offered till eight hours had elapsed, and though there is every reason to suppose that no portion had been rejected by vomiting.—Lond. Med. Gazette, Vol. vi. Liable, then, from these various sources, to deterioration, can we wonder that it has disappointed the intentions of the practitioner, and the hopes of the discoverer?

That the sulphate of morphia, though less liable to objection, partakes of the impurity of its base, is evident from the late experiments of Dr Tully, † who seems to have employed that manufactured by Pelletier, one of the most eminent chemists in France. He found it produce headach as often as opium in proportion to the number of cases in which it was tried,—and in some thirst, loss of appetite, and disordered bowels. It was extremely liable to cause nausea and vomiting soon after exhibition, even after it had been taken continuously for many days; a hoarseness in the morning succeeded the nightly dose; and its effect on the bladder, sometimes amounted to complete retention. This last serious inconvenience, which has been observed to attend at times the administration of the impure morphia, ‡ its acetate, its sulphate, and of narcotine, § has never been experienced by any to whom the muriate of morphia (to be hereafter mentioned) has been exhibited; nor will the most minute inquiries I have been able to make, lead to the supposition, that any power over the bladder or its contents, has ever been sensibly exerted by it. From these circumstances we may conclude, that

---

* Dictionnaire de Médecine, en 18 volumes, Vol. iv. p. 493.

† Experiments and Observations on Narcotine and Sulphate of Morphia by William Tulley, M. D. Prof. of Mat. Med. in Yale Coll.—American Journal of Science, &c. Vol. xxi. No. 1.

‡ *Ibid.* § Ibid.

this influence is peculiar to narcotine, and that the salts of morphia which exhibit it, are contaminated by that principle.

Though these two forms of combination were soon observed to be liable to many imperfections, and little fitted to render morphia useful in medicine; yet so much weight was attached to the declarations of Magendie, who had early pronounced the muriate less beneficial than the other salts, * that the superiority of its claims to the public regard was not known till twelve months ago; when my friend, Dr William Gregory, contributed to this Journal a paper on its preparation, including a letter from Dr Christison on its medicinal powers. †

This is the more remarkable, as the formation of a muriate, entered into several of the latest and most ingenious of the foreign processes for procuring pure morphia, ‡ and may teach us, not to place such implicit confidence on the opinions of even the greatest philosophers as to be dissuaded from investigating for ourselves, when experiment is easy, and accuracy so valuable. The discovery of the excellencies of this useful preparation, which, discarded at its birth, has been neglected until the present day, is likely to fulfil at last the anticipations of Sertuerner, and to unlock to the world, the beneficial effects of morphia. Already have both patient and physician begun to feel its value. It diminishes the sufferings of the former, and increases the reputation of the latter; who finds himself at last enabled to wield the medicinal power of a uniform opiate, and to grasp the reality of that shadowy hope which has so long mocked him in other preparations.

In endeavouring to enable others to form a correct idea of the medicinal value of the muriate of morphia, I shall make no mention of its effects on the system in health,—a state in which we would naturally expect any potent influence to afflict, rather than to gratify. Too much weight is, I think, attached to the results of a mode of experiment which may disclose in outline the qualities of a drug, and determine its class, but can never qualify us to decide on its merit in obviating what ought to be removed, or in remedying what needs amendment. Disease calls forth the powers, and modifies the influence of medicines. That which agitates the calm of health, may sooth the irritation of illness; and that which, without opposition, is inert, may act

---

* Nouveau Journale de Médecine, Paris, 1818.

† Ed. Med. and Surg. Journal, No. 107.

‡ Such as those of Wittstock, Henri, and Plisson, and more recently that of M. Blondeau; the latter part of whose process was rejected by those appointed by the Royal Academy of Medicine at Paris to report on its merits, because, in securing the purity of the morphia, it diminished the quantity of the product.—Jour. de Chem. Médicale, Vol. vi. page 167.

powerfully where it meets an opponent. Experiment should be made on the sick, in order to determine how the sick will be affected; and nothing should be pronounced feeble or useless, merely because it has done nothing—where there was nothing to be done.

I shall proceed, therefore, to lay before my readers the opinions of several medical friends; who have given this medicine a fair trial, and have done me the favour to communicate to me their conclusions; premising, that the solution now in use, is made by dissolving the salt, in a mixture of one part of alcohol to three of distilled water, in the proportion of five grains to the fluid ounce; so that twenty-five minims contain a quarter of a grain.

The following extracts are taken from a letter addressed to me by Mr Liston, one of the surgeons of the Royal Infirmary, &c. and dated the 13th January 1832.

"I have made a full trial of the muriate of morphia, both in my public, and my private practice; and prescribed it to a great number of individuals with, almost uniformly, the best effects. I find it more palatable than any other preparation of opium; equally powerful in allaying pain, calming irritation, or producing sleep; and the cause of nothing unpleasant, either during its operation, or afterwards. The patient has no annoying dreams; his rest is neither feverish, nor disturbed by startings and feelings of horror; neither does his head ache, or feel confused in the morning. And this holds true even with those who are aware they can take no other opiate, without experiencing some or all of these inconveniences. As an instance of this, I may mention the case of a gentleman, from whose back I removed a tumour. I wished to exhibit an opiate at night, but was effectually opposed by the patient; on the plea that he never had taken opium in any quantity, or under any form, without subsequent severe bodily and mental suffering. For seven sleepless nights he maintained his resolution; but exhausted at length, he yielded to my persuasion, and took a dose of the solution. He slept soundly, and awoke a new man. After several repetitions of this experiment, as he at first considered it, he became so enamoured of the medicine, that his attendant was obliged to conceal the phial, to prevent him from having too frequent recourse to it.

"I had last April occasion to try it myself. Having received a severe injury, I took for two successive nights Battley's sedative liquor; but had languor, headach, and brown tongue in the morning. The third night, when the solution was substituted, I rested well, awoke refreshed, and had no annoying sensations from the draught; which I continued to use for a fortnight, with equal effect.

"Were repetition necessary, I could relate many similar cases. Since I was favoured with some for trial, I have almost constantly used it in preference to all the other preparations of opium. From the first it exceeded my expectations; and in one instance only, of its internal administration, have they been disappointed. But here the dose might not have been large enough, for the patient was of a peculiarly irritable habit, and was apparently determined to grumble.

"I have made use of muriate of morphia in external applications also. Dissolved in distilled water it forms an excellent collyrium in many painful affections of the eyes; and made into a liniment it is powerful as a local anodyne."

Mr Liston informs me he makes use of the solution in doses of from twenty to sixty minims.

Dr Macwhirter, President of the Royal College of Physicians, &c. whose experience of it has rendered him a warm friend to this medicine, has favoured me with his opinion, in a communication dated January 28, 1832. It is as follows:

"DEAR SIR,—As far as my experience goes, the muriate of morphia is superior to any preparation of opium in use. For the last six months I have prescribed it in preference to laudanum, the black drop, or Battley's sedative liquor, with each of which I am well acquainted. I have used it in after-pains, menorrhagia, dysmenorrhœa, and all the ordinary female complaints, with the best possible effect. I never have exceeded thirty minims at a time; nor had I ever occasion to increase the primary dose, when I gave it continuously.

"Its hypnotic effect is not so prominent as its sedative; yet though generally longer in inducing sleep than either laudanum or Battley, its beneficial influence seems to me to be more durable than that of either. In about half an hour it produces a state of delightful tranquillity; sleep succeeds at the end of a certain period; and on waking there is no uneasiness, nausea, or confusion of ideas. Though it produces costiveness, it has apparently no effect on the renal secretion, which is made freely at the accustomed periods. During all the time I have prescribed it, it has caused headach only in two instances, and was consequently abandoned; another person, who had long taken laudanum freely for the relief of nervous headaches, on trying the solution of morphia, did not experience the accustomed degree of satisfactory excitement, and therefore gave it up. As I have never either used it externally, or given it to children, I can give no information on these points.

"It appears to me calculated to be particularly useful in cholera, of which the following case is an example.

"An old lady of eighty, was affected with symptoms of

Cholera Britannica, very much resembling *C. spasmodica*, in as much as at one in the morning she was seized with vomiting, purging, and cramps in the limbs, and over the body, most painful to witness. Before I saw her she had suffered for eleven hours; all the features were collapsed, and the extremities cold. I prescribed a mixture consisting of one drachm of the solution of morphia, one ounce of tincture of colomba, and five of cinnamon water; directing two table-spoonfuls to be given immediately, and one every succeeding half hour, till the symptoms were removed. Only one other dose was necessary. She vomited once, on which account the second dose was given. Soon after she fell into a tranquil slumber, and on awaking felt so comfortable, that no more was exhibited. Her maid, a girl of eighteen, was similarly affected, similarly treated, and with the same success.

"I have also found it useful in mental affections, as in the following case.

"A gentleman, aged sixty-eight, had symptoms threatening paralysis, which yielded to the use of purgatives, but were succeeded by a degree of mental excitation and restlessness, which called for some palliative. Twenty minims of the solution of muriate of morphia were given, which did not completely tranquillize till six hours had elapsed; ten more at the end of twenty-four hours, maintained the quiet produced by the first. Objections being now made by an eminent colleague, who disapproved of opiates in cerebral affections, the anodyne was discontinued for a few days. The excitement again rose to a great height, and becoming painful both to the sufferer and to his anxious relatives, he was prevailed on to allow ten minims to be given. The former happy consequences reappeared; the irritation subsided; the patient slept soundly; and he has ever since derived the same benefit from the same quantity, administered at proper intervals."

Dr Macwhirter has enclosed the following letter from a medical friend, suffering under a distressing degree of mercurial irritation; which illustrates the good effects of regulated doses, the evil effects of an over-dose, and the probability that, where it appears to disagree, the real cause may prove, as in this instance, to be some accidental collateral circumstance attending its exhibition.

"Having had considerable personal experience in the use of the muriate of morphia, I willingly accede to your request, that I should make you acquainted with its effects. During the early part of the winter, I was suffering much from rheumatic pains in my limbs and joints;—these were so severe during the night as altogether to deprive me of sleep. I tried opium, laudanum, and Battley's preparation, with very partial relief; the narcotic benefit at night, being more than cancelled by headach and weariness in the morning. I was now recommended by my friend Dr W. Gregory, to try the solution of muriate of morphia. I began with twenty-five drops; but not deriving therefrom so much benefit as I had expected, I increased the quantity to fifty, sixty, and on one occasion to eighty-five drops.

"This last dose was followed by very unpleasant symptoms; such as great acceleration of the pulse, violent palpitation of the heart, extreme restlessness, and confusion of ideas. I do not know how long I remained in this state, but when I awoke in the morning, I was much exhausted. Since then I have taken it regularly, never exceeding forty drops, with the happiest results. For the last two months I have never gone to bed without a draught containing that quantity at my bedside. I drink it generally after having been an hour in bed; it acts on me like a charm, transporting me from a state of pain and restlessness to one of delicious repose,—more agreeable, even, than the sleep that succeeds. I awake totally free from headach, languor, or oppression; and by taking a little opening medicine, I easily obviate its binding tendency. I do not find it necessary to go on increasing the dose, forty drops being the quantity that affords me greatest relief. As its action is more anodyne than hypnotic, I can now go to bed almost with the certainty of a night of rest, if not of sleep. It is a most valuable medicine.

"*Edin. Jan.* 25, 1832."

Dr J. Mackenzie of this city, from whose communication I shall next make some extracts, prepared the salt with which his trials were made, under the direction of Dr Gregory.

"I am inclined to consider the muriate of morphia a direct sedative, and not so much of a hypnotic as opium. I have used it repeatedly combined with ipecacuan as a diaphoretic; also, combined with bitter extracts, in mucous diarrhœa; with uniformly good results. I have been much pleased with its sedative operation after delivery; and the lozenges made with it have been largely used by a consumptive patient. The case was hopeless, and for many months before his death they greatly alleviated his sufferings. Expectoration was not checked, but the frequency and violence of the cough much abated. I vary the dose according to circumstances, from a quarter to half a grain, during the twenty-four hours. I have never exceeded three quarters of a grain at a time. In one instance, only, have I observed it disagree. The circumstances are interesting. They are as follows.

"A lady, to whom I had given the solution on two previous occasions, for some time, to the extent of thirty or forty drops, with the best possible effects; had 'fallen off her sleep,' to use a vulgar but expressive phrase, about three months ago. Her general health was good, and the wakefulness seemed to arise from anxiety merely. Twenty drops of the solution, given at bed-time, procured rest, but no sleep. Forty, taken a few days after, with the same results, caused a feeling of giddiness before getting into bed, and slight nausea in the morning; with loss of appetite,—a symptom which had never before occurred. Anxious to ascertain the effect of a larger dose, seventy-five drops were next given; which caused an increase of the giddiness at bed-time, no sleep, violent headach all night, and sickness and vomiting on rising. The headach and sickness, with occasional retching, even in the recumbent posture, lasted for two days; an erect posture caused the contents of the stomach, mixed with bile, to be thrown up instantly. Lemonade and biscuit were the only things she could take in the way of sustenance. These disagreeable effects wore off gradually, along with the affection to palliate which the solution had been given; and she has since taken it in moderate doses, with its former good effect. Its failure must, therefore, I think, be ascribed merely to the existence of an unusual state of constitution, about the time of its exhibition."

My intelligent friend, Dr John Scott, residing at Barnes, Surrey, whom I supplied with a small quantity about a year ago, considers the muriate of morphia the best anodyne and sedative he is acquainted with, and now uses the solution constantly, instead of laudanum. He never knew it act on the renal secretion, or the organs connected with it, in any unpleasant way. Dr Abercrombie considers it a valuable addition to the Materia Medica, and has found it particularly useful in those idiosyncrasies which did not admit of the use of laudanum. He has not observed any influence on the bladder. Dr Alison, Professor of the Theory of Physic in the University, has also a high opinion of its qualities; and would have favoured me with his conclusions at greater length, had not his time been completely occupied in making arrangements to ward off the dreadful scourge, that is at present raging in the suburbs of this city. Dr Graves, Dr Stokes, and others in Dublin, have also found it answer remarkably well. Dr Loudon, an eminent practitioner in Cheltenham, says, "I have tried the muriate of morphia in several cases; I consider the discovery of it as the greatest that has been made in modern medicine; and such is my confidence in the certitude of its effects, that I do not know whether I shall ever use opium, as a narcotic, again. In a case of cancer of the breast, I am sure it was the means of saving a great deal of pain and misery; and as a palliative generally, it is truly a most noble medicine."

Dr Scott of this place has used the solution of muriate of morphia extensively, and thinks it not liable to induce headach, stupor, or sickness. In moderate doses he finds it act as a direct sedative, with scarcely any appearance of stimulation. In painful affections it produces a quiet and comfortable state, when not successful in inducing sleep. His dose is from thirty to forty drops, most frequently the latter. One patient, in whom laudanum produced a kind of delirium, got fifty drops, in consequence of a very severe injury to the wrists, and fifteen more in the course of the night, with great relief of pain, sound sleep, and no subsequent disorder.

"I have used it," he continues, "in the cholera of this country, which has been so prevalent in this neighbourhood since last autumn, with much advantage. I gave forty drops as a medium dose, combined with two tea-spoonfuls of magnesia, and a few drops of aromatic spirit of ammonia. This generally relieved in a short time, the spasms and vomiting. If rejected, the dose was repeated; and if complete relief was not obtained, half the original quantity, followed by calomel and castor oil, generally sufficed. I have also employed it in severe cases of dysentery, along with the usual treatment. I have found it extremely useful in that very troublesome form of bowel complaint, arising apparently from an irritable state of the mucous membrane, which can neither be easily checked, nor allowed to go on without danger. A tea-spoonful of castor oil, with eight or ten drops of the solution, and a dessert-spoonful of the chalk mixture, repeated as occasion required, I have found a very useful mode of treatment.

"I have also exhibited it in the latter stage of fever, to procure a quiet night, when I should scarcely have ventured to give any other form of opium. In phthisis, I have found it useful in repeated doses of ten or twelve drops. It has usually been given in about half an ounce of water, and the strength has always appeared to me to have been uniform.

"In a case of tic-douloureux of the face, the lady by mistake took an over-dose, probably a drachm and a-half, the whole contents of a phial intended to have been used at intervals. The first effect was stupefaction, which was succeeded by severe headach, and violent and incessant vomiting. Vomiting whenever the patient raised her head from the pillow, continued for eighteen hours. The pain in the face was, however, completely removed."

Through the kindness of Sir William Burnett, I have seen a "Report on the effects of the Muriate of Morphia," by Dr Dickson, physician of the Royal Naval Hospital at Plymouth, dated February 8, 1832.

His trials were made on sailors, a class of persons "who, having previously enjoyed unbroken health and profound repose, are apt to think that they have slept very indifferently, if they wake twice or thrice, or remain awake for an hour or two during the night." Of twenty patients, five enjoyed sound and refreshing sleep; ten passed the night comfortably in partial repose, with diminution of cough and pain, and with subsequent benefit; while five either did not allow that they had slept at all, or were affected with unpleasant symptoms. "To some of these," says Dr Dickson, "who were probably not in a fit state for its exhibition, I have no doubt it might be given with better effects at another time. In one of them, the irritation of coughing caused the stomach to reject the acetate as well as the muriate in solution, while ten grains of an opiate pill are retained." But the small quantity of muriate put into his hands being expended in five days, he had no opportunity of trying it in a solid form. Subsequent trials with the solution of the acetate of morphia led to the conclusion, that the acetate they are using in the hospital "is a much less pure or less active preparation than the muriate of morphia." He considers it much more sedative than stimulant; and concludes that its cheapness, purity, and permanency alone, "entitle the muriate of morphia to be received as a valuable acquisition to the Dispensatory, and to the military and naval medicine chest."

He mentions that a gentleman, who has taken large doses of opium or laudanum occasionally, was induced to try a whole grain of the muriate at once, by way of experiment; and had calculated the distressing effects that ensued, to have been equal to those, which ten grains of opium might have produced in him. Soon after swallowing it in the evening, he became excessively sick; and notwithstanding copious dilution, he continued to vomit all night, at intervals so short as to prevent his taking any repose. He experienced also severe pains in the bowels; and the eye was so morbidly sensible, that he saw flashes of light, and could not bear to look at any bright object. When visited in the morning, he was suffering from nausea, loss of appetite, and nervous agitation, but without much headach; and had the appearance of a man who has been much intoxicated. The bowels required a strong purgative to move them, and the second night was passed in short and interrupted slumbers. On the following day his appetite and healthy feelings returned, and next night he enjoyed profound repose.

From these communications we learn, that the muriate of morphia, judiciously administered, is preferable to other forms of opium, chiefly on account of causing less subsequent disorder of the system. That it proves in general more anodyne than hypnotic,—that it may be prepared of uniform strength,—that the instances in which it disagrees are comparatively extremely rare, and may depend on temporary or incidental circumstances merely,—and that, possessing little stimulus, and powerfully sedative properties, it is likely to be useful in febrile states, where a less pure opiate would be inadmissible. The result of my own experience confirms, as far as it goes, these deductions.

The first time it was ever tried, was in the case of a young woman in the lower ranks of life, subject to most acute suffering from a chronic abscess in the back; in whom all other narcotics were either inefficacious or hurtful, opium especially. To her the solution proved such a blessing, that she used to hail with tears the hour of its administration; and after using it every night for some months, gave it up without difficulty; having only had occasion to increase the primary dose, 10 drops, during the whole of that period. I have also found it a sovereign remedy in coughs unaccompanied with much febrile irritation. In the chronic catarrh of old people, more especially, it quiets those distressing and exhausting fits of coughing, which harass at intervals the infirm sufferer. In solution in doses of from six to ten minims, with vinegar of squill, or combined with ipecacuanha in lozenges, it assists expectoration; while it allays the tickling irritation in the windpipe. In a medium dose I have found it very effectual, from its binding tendency, in repressing diarrhœa; and in a small dose useful in dyspepsia, in rendering the stomach capable of bearing sulphate of quina without pain. Taken in the morning, it does not produce drowsiness during the day, but a calm and tranquil state of mind; and thus may be useful to those who, having to undergo much mental labour, feel distracting sallies of the imagination interfere with the necessary concentration of thought. From one-fourth to half a grain divided into small doses, which, conjoined with capsicum, may be taken at convenient intervals, is a very effectual means of nerving a mind apt to be agitated with the dread of failure; and of insuring the calm self-possession so necessary to the success of a public appearance. This hint will, I trust, prove useful to those, whose constitutional sensibility is likely to render all their exertions, and all their knowledge, of no avail in the hour of trial. Its speedy action may be facilitated, or insured, by avoiding food for at least an hour before and after its exhibition, by taking care that it be not decomposed by substances combined with it in the prescription, and by drinking occasionally of some acidulated liquid, until its effects begin to be felt. Its taste, which is purely bitter, is easily covered by syrup, flavoured with an aromatic; an ounce and a-half of pure water even, will render a medium dose (25 minims) tasteless.

As to its external administration, made into an ointment, I have found it an excellent application to painful hæmorrhoidal tumours;—in the form of a suppository, it has been useful in diseased prostate;—dissolved in distilled water simply, it forms an anodyne wash for painful ulcers;—and as a collyrium, eases the pain of many affections of the eye. From my personal experience of an overdose, I can recommend wine and cordials in repeated doses, cool fresh air, and a horizontal posture, after the vomiting that generally occurs has thrown off what of it remains on the stomach;—to be followed up when the stomach will retain it, or in any other way, by a laxative, whose operation generally completes the cure.

It may be given along with the following substances. Carbonate of magnesia at a temperature not exceeding 90° F.; chalk-mixture; antimonial wine; all tinctures that are not ammoniated, and most neutral salts, where, even were an exchange of bases made, no harm would result. It is decomposed by potash, soda, ammonia, and their carbonates; infusion of galls, lime-water, hartshorn, and magnesia.

The solution sold by Mr Duncan, 52, North Bridge, is prepared by dissolving the salt in hot water, filtering, and then adding the rest of the water, and the alcohol. Great accuracy is necessary, and great pains are taken, to secure uniformity. Of the lozenges, forty contain one grain of the muriate of morphia.

Process for preparing pure Muriate of Morphia.—Having now finished my illustrations of its medicinal effects in a state of purity, I shall direct the attention of my readers to what appears to me the best mode of securing this, and the readiest method of ascertaining it. And as I intend subsequently, to point out a way of obtaining, not the muriate only, but any other salt of morphia, in a state of purity, and in as far as its individual composition will allow, of uniformity also; I shall take a brief view of former processes, that the value of the improvements may be more clearly seen.

Until the introduction of the muriate into medicine, the salts of morphia were prepared on a plan divisible into four stages; which had for their ostensible objects, the separation of the active from the inert principles,—the isolation of the morphia,—its decolorization,—and its recombination with acids. The first was accomplished by dissolving the salts contained in opium,—the next by decomposing them with an alkali,—the third by treating the precipitate with charcoal, and alcohol,—and the last by dissolving the product in an acid. Latterly, comparative purity had been obtained by decolorizing a salt of morphia, which was afterwards decomposed to procure the alkaloid for recombination. The first step has been effected at different periods by means of water, hot or cold, acidulated or plain; or lastly, by fermentation. In whatever way it is made, the infusion contains a free acid, more or less resinous colouring matter, solutions of morphia, and of narcotine. The three last, intimately blended, are thrown down on the addition of ammonia; animal charcoal, and repeated crystallizations in alcohol, remove the colouring resin; but the narcotine passes untouched through all these ordeals, and from its similarity to morphia, has been generally mistaken for it. This impure product being dissolved in the acetic or sulphuric acids, the liquid is evaporated to dryness; and thus the narcotine remains mixed with the resulting salt, either in a crystalline form, (if, as Robiquet asserts, it be crystallizable,) or in the shape of a transparent coating, enveloping its particles.

Some chemists, indeed, as Merk and Wittstock, have, by ingenious and expensive processes, obtained morphia perfectly pure. But I speak of the alkaloid as it is generally manufactured; when the object of the pharmaceutist being merely to procure a saleable article, purity is little valued, and not particularly sought after, when it is obtained at the expence of considerable diminution in quantity.

It is easy to observe that the complication of treatment which these processes require; the combinations, decompositions, solutions, and crystallizations which they enjoin; the evaporations and filtrations which they direct; cannot be completed without considerable expence of time, labour, and material. But by introducing into medicine the muriate of morphia, and publishing a mode of preparing it, Dr Gregory rendered the latter part of these processes useless, and abridged much that was tedious and objectionable. I have now to propose an improved method; which, by curtailing still farther the necessary operations, will render the preparation of the muriate, much more easy and economical.

This process has for its prominent feature the employment of *double* decomposition; a plan which secures at one step the separation of the meconic acid,—and the union of the morphia with muriatic acid. The liquid employed to effect this decomposition is the muriate of lime; an article whose cheapness renders economy in its use no object. Perhaps in other places, muriates may be found more suitable, for other reasons; but this one seems to me best calculated to enable us to procure, on the one hand the meconic acid free from colour, on the other the muriate of morphia free from narcotine.

The first step of the process resembles that of all others, in as far as the solution of the active principles is concerned. The opium, cut in pieces, is macerated in water at a temperature not exceeding 100 F.; as it softens it is worked up into a pulp, and frequently stirred during the course of exhaustion;

the infusion, as it becomes saturated, is drawn off clear, and may be immediately subjected to evaporation.

This evaporation is conducted in a large vessel of tinned iron; and a sufficient quantity of marble, in coarse powder, is added to saturate the free acid. The muriate of lime used should contain no iron, lest, in combination with meconic acid, it give a deep colour to the liquid, difficult to be got rid of; and the quantity required for each portion of infusion, is best learned by experience. When the infusion has reached the consistence of syrup, an excess of muriate of lime is poured in, and the boiling is continued for a few minutes longer. Then the whole may be emptied into a large basin, and when cold, diluted with water, until a copious separation of resinous flocks takes place. In this way most of the meconate of lime, which is nearly insoluble, and a great quantity of colouring matter, are got rid of;—the separation of the latter being the more copious and complete, the more concentrated the liquid is before dilution, and the nearer that dilution approaches a certain point; after which, further dilution causes the flocculi to be partially redissolved, and to render the filtered liquid turbid.

When these flocculi have subsided, the clear part is evaporated as far as possible, on a sand-bath; a small bit of marble being put into each dish to neutralize any free acid, and the fluid being poured off the sediment before it is permitted to crystallize. We may, at this stage, prove whether enough muriate of lime has been added, by trying if a little of the clear liquid will, aided by heat, separate meconate of lime from an equal bulk of concentrated infusion. When about to consolidate, it is stirred into a uniform mass, from which, enclosed when cold in a stout cloth, the dark fluid is expressed as completely as possible. The cake of impure muriate is dissolved in water at 70° F., and the solution filtered through cloth, whereby a large quantity of impurities will be separated without loss; the liquid, to which a small portion of muriate of lime is added, is now re-evaporated, neutralized, and treated in other respects as before. In the next evaporation the liquid, now completely free from meconate of lime, is slightly acidulated; a judicious suggestion due to Dr Gregory, who has observed that the acid renders the colouring matter more soluble, and thus more completely separated, when the product is expressed for the third time. The muriate, which is now of a light brown colour, is next dissolved in boiling water, carefully neutralized with chalk, and mixed with animal charcoal; which, provided it do not contain a free alkali, requires no purification. Fresh portions of hot water should, from time to time, be added, until there is enough to keep the salt in solution when the liquid cools; and the whole is to be frequently stirred, that the *most* may be made of every particle of charcoal. The temperature should not permanently exceed 190° F. lest any of the muriate be decomposed. If the charcoal be good, and in sufficient quantity, at the same time that the liquid is dilute, and frequently agitated, twenty-four hours of contact is sufficient to decolorize it so far, that on the addition of a little acid to the filtered liquid, it becomes almost colourless. This effect produced on the colour by the addition of an acid (and any acid will do) I cannot explain. It was first observed by Dr Gregory, who has also remarked that muriatic acid, added to a neutral solution of muriate of the specific gravity of 1.020, when cold, and in which there is no appearance of crystallization, causes it in a short time to become a mass of crystals, which, when dried in the air, are perfectly neutral.

The mass that results from the evaporation of the decolorized liquid, is subjected to pressure in portions of about six ounces each, tied up in well-washed cotton cloth; the superfluous ends of which are cut off, in order to prevent them from making the surface of the cake irregular. They are next put into a stove heated to about 100° F. where they remain until almost dry, when the cloth is removed and the coloured surface scraped off. After being pounded and dried *till no more weight is lost* at a temperature of about 150° F. the muriate resembles chalk in colour and appearance, is permanent in the air, and is fit for medical use. If a little be now dissolved in distilled water, and pure potash added, crystals of morphia are presently separated, which are completely redissolved on the addition of an excess of the alkali, the absence of the characteristic milkiness, changed by heat to woolly flocks, indicating a total freedom from narcotine. A very few coloured flocculi may remain, so inconsiderable in weight as to be of no moment, and totally removed by filtration; as is any remaining yellow tinge by a fresh crystallization, if the liquid be previously well acidulated.

In this process, if properly conducted, the loss by manipulation is trifling. The whole of the morphia is separated in a solid form in the first and second crystallizations, provided there be present in the liquid a slight excess of muriate of lime, and the evaporation be carried far enough. The great deliquescence of the muriate of lime apparently facilitates the completeness of this separation. The dark liquids expressed on these two occasions may therefore be deemed void of muriate; the mother liquids of future crystallizations, as well as the water in which the cloths have been rinsed, are added to a portion in an earlier stage of advancement; and the coloured particles scraped from the cakes, may be joined to that about to be treated with charcoal. It is absolutely necessary that all the neutralizations be made with lime, (marble will not decompose the warm liquid, nor chalk the cold,)—that all the evaporations be carried as far as possible before setting aside to crystallize—that the mass be always stirred when consolidating—and that the mother liquids be expressed very completely from the crystals, enclosed in a cloth. The charcoal does no good until most of the resin be separated, and leaves a dark tinge in the liquid, only to be removed by acidulating. A moderate excess of muriate of lime is proper, too much renders the mass clammy, and the mother liquid difficult to express; too little causes the decomposition to be incomplete, and the muriate that is formed refuses to crystallize; but these errors are easily remedied.

In the last experiment that I made, 54½ lbs. Avoird. of good opium were macerated at once. This quantity had lost one pound and a-half of its weight previous to infusion, by standing for three months in the laboratory, having been previously reckoned 56 lbs. From it were obtained, by the process just described, 91½ ounces Troy of muriate, or rather more than 11½ per cent. Several accidents happened during the preparation, from the breaking of dishes; besides the opium was not completely exhausted, nor were the mother liquids collected with due regard to economy, or I have no doubt the other ½ per cent. might easily have been made out; and 12 per cent. is, in my opinion, the utmost that can be expected from ordinary opium, losing from 8 to 9 per cent. by drying. The cost of manufacture, including the price of the opium, &c. amounted to 17s. 6d. the ounce Troy. This then may be reckoned a fair trial of its success on a large scale.

With regard to the adulteration of this article, for I fear that adulteration, though easy of detection, will still be attempted; the most likely manner of increasing its weight will be, not to deprive it completely of moisture. This may be detected, simply by ascertaining how far heat lessens the weight of a certain number of grains. And druggists are entreated to take particular care to avoid using muriate that is not perfectly dry; as this, which may proceed from accident as well as design, is, more than any other cause, likely to impair the uniformity of its preparations. In the state of powder it may, perhaps, be mixed with chalk, magnesia, starch, carbonate of baryta, sugar, and other white powders; a species of adulteration which may be completely prevented by preparing it in crystals. But as this requires more time and manipulation, I may here observe, that all insoluble powders are detected by its solubility in hot water, starch by iodine, and sugar by the taste, and the form of its crystals on evaporation. I may here too mention, that I have seen in chemical works, particular cautions given to avoid the fumes of boiling infusions of opium, as if they were highly deleterious-

But though engaged for many months in examining the component ingredients of opium, and though I have been exposed for hours together to the concentrated vapours of infusions, I have never experienced the slightest inconvenience therefrom; nor do I believe there is the least particle of narcotic principle contained in them.

These are all the particulars I have to mention with regard to the manufacture of the muriate of morphia. I come now to describe a method, by which any other of its salts, may be prepared in a state of purity, from crystals of impure morphia.

For the principle on which this process is founded, I am indebted to M. Buisson of Paris, who states in his Thesis, that the salts of ammonia are decomposed at an elevated temperature, by the salifiable vegetable bases. On trial, I found that morphia, boiled in a salt of ammonia, displaced the volatile alkali, while narcotine had no such power; and that, when morphia, mixed with narcotine, was boiled in muriate of ammonia until no more ammonia was driven off, the narcotine was left undissolved in the form of powder, while the morphia had disappeared. In order then to form a pure salt of morphia from a mixture of the alkaloids, I boil them in a little distilled water, dropping in, carefully, a neutral solution of the acid in combination with ammonia, until, on a further addition, no more fumes of ammonia are exhaled. The liquid is then filtered, to separate the narcotine; the morphia may be obtained by precipitation. It is proper to remark, that the crystals must be tolerably free from resin, in order that a perfect separation take place; and that the colouring matter, also, seems to have the power of decomposing the ammoniacal salt. This process may be hereafter useful in rendering narcotine pure,—a principle which, it is probable, will ere long become more esteemed in medicine, than it has hitherto been. It may be modified in various ways, to suit the convenience of the operator; and is a great aid in the examination of small portions of opium; as in estimating the value of a sample.

ART. VIII.—*Narrative of an Epidemic English Cholera that appeared on board the ships of War lying in ordinary in the River Medway during the Summer and Autumn of the year* 1831; *with Cases exhibiting the Nature and Treatment of the Disease; and inferences on the probable Nature and plan of Cure that might be found successful in cases of Blue or Malignant Cholera.* By JAMES HALL, Esq. Surgeon, R. N.

As surgeon of his Majesty's ships that lie in ordinary in the river Medway, the medical care of nearly 700 persons of both sexes, and of all ages, devolved on me. Owing to the excellent state of cleanliness and free ventilation observed on board these ships, there is usually but little sickness among them, although intermittents are endemic at this place, in consequence of the marshy lands about it. But as an unusual epidemic disease, having many of the essential symptoms of Asiatic cholera, suddenly broke out on board the ships, at a time coincident with the arrival here of vessels from places where Asiatic cholera was prevailing, it became a subject for reflection, whether the epidemic arose from a peculiar condition of the soil and atmosphere here, or from some miasm communicated to the atmosphere by exhalations from the newly arrived vessels. And, also, whether by analogy the treatment that was found successful in one species of cholera might not be equally so in others. This led me to draw up the following paper, as the basis of a dissertation.

Narrative.—Since the days of plague, no disease is I believe recorded to have appeared in this part of the globe equal in malignity to that known by the name of malignant or Asiatic cholera; hence the first appearance in the river Medway of vessels that had lost some of their crews by this disease, excited attention and alarm in this place.

In a creek of this river ships from infected foreign ports perform quarantine. In the month of June 1831, numerous vessels arrived here from Riga, where cholera was then raging; and these vessels anchored very near the ships of war. Early in July a slight case of cholera appeared on board one of the ships under my charge; and after a few days an officer on board another ship was attacked. At the commencement of August a woman and her infant were attacked, and, after a few hours, her husband. Circumstances at the time tended to mask the real nature of these cases, as ague is endemic here, and hot sultry weather had succeeded cold and wet. The ships that had arrived had no sickness on board, although several had suffered by it at Riga; hence the first case was looked upon as an irregular attack of an intermittent; the second as a dysentery of the season; and the third, which included a family, was considered by the individuals themselves as a bowel complaint, produced by their having eaten bad salt fish. The mother and child, after twenty-four hours' illness, recovered spontaneously whilst I was absent; and on my return, the husband reported himself. He had been suffering about twenty hours; although there were present some peculiar circumstances in the succession of attack of the infant, mother, and husband, and there were peculiar symptoms in *his* case, yet the cause assigned seemed a probable one. He had been labouring many hours under vomiting, purging, constant retching whenever he attempted to pass any thing into the stomach, and a peculiar kind of uneasiness in the epigastrium. Having the natural dread of irritating an irritable stomach, I first bled my patient, and then with some anxiety gave him an emetic; my joy was only equalled by my surprise on finding that this simple remedy had no sooner operated than every ill vanished. I now began to reflect, but still I did not suspect that an epidemic cholera was present till the next day, when I was called upon to visit several persons. In all the attack was sudden, and the train of symptoms similar; but these varied in severity in different individuals.

In general the first symptom was an uneasy constriction or cramp, deeply seated in the epigastric region, which awoke the patient if the attack occurred in the night, from a sound sleep; and was speedily followed by profuse vomiting and purging of watery fluids. In some cases the attack was preceded a few minutes by partial shivering or chill; a coldness and numbness of the fingers; and momentary distension of the upper part of the abdomen. In a few other cases the attack was preceded for a day or two by frequent partial distension of some of the intestines, by sudden formations of gas, and a slight diarrhœa; but the appetite was not disturbed till the attack commenced.

After copious evacuations incessant nausea remained, attended with retching of phlegm or slimy mucous matter; sometimes a sudden gush of a fluid like barley-water. These were rapidly followed by coldness of the surface of the body, especially of the lower extremities up to the thighs, and of the face; cold clammy perspiration on the forehead, with dryness of other parts of the body; cramps in the abdominal muscles; circulation always enfeebled; and sensation diminished; much thirst; the respiration feeble, and the voice faint. The countenance was at the same time sad, somewhat ghastly, and the eyes sunken, with a black broad streak or semicircle below the inferior palpebra; the patient was torpid and indifferent to surrounding objects, except when disturbed by cramp or retching; but the mind remained clear. The tongue was little altered in appearance, having only a thin coat of dirty-white mucus.

The urine was found to be suppressed during the presence of the disease, whenever inquiry was made; but as the patients were promptly seen as soon as the disease had commenced, and were all cured speedily, little attention was paid to the state of this secretion by either the patients or myself. In all cases a warm and *general* sweat, which was often profuse, and a tranquil sleep, were the certain signs of recovery. Among those attacked there were some where there were seen slight signs of the fatal *blue cholera.* Of these one was a child, æt. 4 an. who, whilst at play with other children, soon after breakfast, on August 14th, was suddenly seized with giddiness, cramps, and the usual other symptoms, together with a general coldness of the skin, and a livid appearance of the hands and feet. The alarmed parents instantly wrapped the child in a heated blanket, and then came to me.

The disease now appeared as an epidemic on board various ships, attacking infants, children, and adults, of every age and rank in life. At all hours, by night and day, individuals, sometimes a whole family at once, sometimes the several members in succession, were attacked with this epidemic. Persons who arrived in perfect health from distant places were suddenly seized after coming on board these ships to reside. The interval between their arrival and the attack of the first symptoms varied from sixteen hours to forty-eight, but in some cases a week intervened.

Between the 7th and 9th of August, there occurred thirty cases of sudden attack of cholera, which continued to spread, or rather to prevail, during all this month; in September, it moderated; and in October, it ceased as an epidemic. About 120 persons were attacked during the periods mentioned; and all were convalescent on the following day, except the second case, the true nature of which, by not having been seen till several hours after the attack, when the disease had put on another aspect, was not discovered; and an injudicious mode of treatment being employed, the patient was for some days in danger, and his convalescence was tedious. From October, up to the middle of January following, several cases of cholera occurred at intervals; some few having a febrile type, with purging or vomiting; others were strongly marked cases of epidemic cholera.

The predisposing cause seemed to consist in a susceptibility of the system of the person seized.

Exciting Cause.—As no similar disease is recorded to have ever been seen here, as an epidemic, before;—as no cases of cholera appeared on board the ships of war until full three weeks after the merchant vessels under quarantine, from Riga, had arrived in the river,—it seems more than probable, that the exciting cause was a miasm radiating from the ships that had been affected with cholera; for the most violently affected of the ships of war were those that lay the nearest to those ships.

Diagnosis.—The symptoms distinguishing this disease from the bilious cholera were,—its sudden attack; the diminished sensation and coldness of the extremities; sinking of the pulse;

shrinking of the features; vomiting of serous and mucous fluids, either insipid, or of a sour and peculiar taste, and rarely mixed with bile; sudden and great prostration of strength, with urgent thirst.

Treatment.—This may be told in a few words; for having practically discovered the efficacy of exciting full vomiting by emetics of ipecacuanha, I employed this in future in every case without exception. Several of the cases were infants at the breast; some were pregnant women; and one was a female above eighty years of age. On being called to a case, the patient was ordered to bed, if not already there; boiling water and hot oat-meal gruel, well sugared, were directed to be instantly prepared. Having with me the necessary medicines, and having examined the state of the patient, a scruple or half a drachm of ipecacuanha powder was mixed in a wine-glassful of warm water, and given. If the stomach instantly rejected it, the dose was repeated. If the patient was observed to be throwing up alimentary matters, the emetic was not given till this vomiting had ceased; because the emetic would have been discharged with these, and the vitiated secretions conceived to be lodged in the duodenum would have remained. In every case, an ash-coloured, slimy, consistent fluid, of a peculiar as well as sourish taste, was discharged by full and efficacious vomiting. In the meantime flannels, wrung out of hot water, were applied to the epigastrium, till all uneasiness there had ceased. In about an hour or two after the administration of the emetic, the following pill was directed to be given:

℞ *Opii colati grana duo, Pulv. Antimon. gr. quinque, Saponis q. s. ut fiat pilula;*

and for drink, warm gruel, sugared. And on the ensuing morning a powder as follows was taken in thin gruel:

℞ *Sulphatis Magnesiæ drachmas duas, Pulveris Rhei scrupulum unum. M.*

No more medicine was required or given. The emetic was said by the patient to act like a charm. However violent the purging had been, however incessant the nausea and retching, both ceased after the vomiting. Hence it became necessary to carry through the intestinal canal any remains of vitiated secretions, and to counteract the astringent effect of the opium. No other article of food was permitted than the oat-meal gruel for the first twenty-four hours. On the day after the patient was generally found convalescent, and having a desire for food, but complaining of debility; and on the third or fourth day he resumed his usual avocation.

Such was the plan of treatment observed, and with successful results, in all cases of this epidemic. Of course, attention was given to the age and condition of the patient in apportioning the dose of the remedies administered. It is hardly necessary to add, that calomel was not given, nor the lancet used, but in two cases. No case of a second attack occurred; but a relapse took place in my own case, and nearly proved fatal from exhaustion, and erythema of the stomach and intestines,—produced by returning too quickly to duty.

Owing to the promptness of the attendance on the patients, and their speedy recovery, no opportunity offered during the height of the epidemic of learning what would have been the state of neglected or protracted cases. But it has been observed that the second case was considered as dysentery; and I may here add, that, from the constant gastric irritability that existed for three or four days, it is probable that erythema of the gastric organs was the cause of it.

With regard to choleric fever, one well marked case occurred at the latter end of November in a little boy, æt. $3\frac{1}{2}$ an. The mother, an infant three months old, and this child, had all been suddenly seized on the Monday. She recovered spontaneously. On Friday my attendance was called for. The children were found labouring under a state of abdominal irritation, with nausea and frequent purging of fluid like rice-water with chalk; and in the boy there was a continued fever of a low type, with delirium in the night. Here the treatment commenced with emetics in both cases; and although this was the fifth day of the disease, the peculiar grey choleric mucus was discharged by the emetics, and instant amendment was observed.

In December a case of cholera occurred in an officer who was exposed one night to a sudden change of weather from temperate and dry, to cold, wet and stormy. He was seized with the usual symptoms of cholera. Being absent, I did not see him till late in the evening of the next day, when I found him affected with general febrile excitement, occasional watery purging and nausea. For twenty-four hours the case was treated by employing diaphoretics. The amendment produced was merely temporary. At one hour the alimentary canal was tranquil, and the patient described himself as doing well; at another hour copious watery purging returned. An emetic was now given. On examining the ejesta last thrown up by the stomach, the usual choleric mucus was seen. The experiment satisfied me; but the patient suffered longer illness therefrom; and, although attention was given him, his convalescence was tardy.

It is now time to exhibit a few of the cases of this disease, as extracted from an official journal, in order to illustrate what has been already dwelt upon, and to exhibit as bases, whence inferences may afterwards be drawn. It is proper to premise, that, in every particular case to which I was called, notes were taken of the essential symptoms at the bed-side of the patient; and the history of the case minutely investigated. My assistant, an experienced and very industrious medical officer, ably seconded me; and thus I am enabled to present the prominent features of each case given, divested of the various details which the clinical routine of isolated cases receive.

Case 1.—H. M. S. Temeraire. (*Cholera epidemica* not suspected.) *August* 6*th*, *vespere*. S. R. æt. 24, tall, robust, usually healthy, states that on the afternoon of the 4th, having eaten some ill-looking salt fish at dinner, his child, aged 10 months, was suddenly attacked with pain in the epigastrium, screaming, purging of dark watery fluids; frequent retching. During the night complaints subsided. On the 5th, in the afternoon, his wife and himself were suddenly attacked with cramp in the epigastrium, nausea and retching of phlegm, and purging of dark fluids, without tenesmus or tormina. The woman vomited copiously during the night, and her complaints subsided after a few hours, but the man had cramps in the lower extremities, and finding himself hourly losing strength and becoming worse, he has now reported himself.

Symptoms.—Nausea; frequent retching of phlegm; occasional purging of dark fluid: cramps in the epigastric region and down the thighs; headach; dimness of vision; general uneasiness; great prostration of strength; thirst; tongue whitish; skin dry; pulse 96, soft.

V. S. ad ℥xx. *statim, et postea capiat pro emetico, pulv. Ipecacuan.* ʒ*ss. more solito.*

7*mo die.* He threw up mucous matters. His complaints soon after subsided. He slept well; has not had any motion; and considers himself able to go to duty. Blood drawn natural in aspect.

℞. *Sulph. Magnes.* ʒij. *Pulv. Rhei,* ℈j. *Aq. Menth. pip.* ℥ij. *M. Ft. haustus stat. sumendus.*

Case 2.—H. M. S. Æolus, *August* 9, 8 A. M. Mr H. æt. 53, a stout, healthy man, arrived on board his ship on the evening of the 6th from Portsmouth, *via* London, yesterday, late in the afternoon. He was suddenly seized with a rigor, trembling of the hands, pain in the epigastrium, nausea, retching, vomiting of greyish slimy mucous matters, followed soon after by sudden copious dejections of watery fluids of an inky colour, general uneasiness, and extreme prostration of strength. Having vomited twice, and purged four times, the symptoms moderated. He passed a restless night. He has now much thirst, nausea, pains in the epigastrium, chilliness, pain in the head, prostration of strength, pulse small and weak, skin dry, tongue white.

The patient was ordered to bed; and hot water and oat-meal gruel, well sugared, instantly directed to be prepared. Flannels wrung out of the hot water were also directed to be constantly applied to the abdomen till all uneasiness should cease; and warm gruel to be freely drunk.

℞. *Pulv. Ipecac.* ʒss.

To be mixed in a wine glassful of warm water and taken immediately.

℞. *Pulv. Antimonialis gr.* v. *Opii colati gr.* ij. *Sapon. q. s. M. Ft. pilula, quæ capienda est horâ unâ post vomitum finitum.*

10*mo die*, 11*mo duty*. Patient has a desire for food, and complains only of debility; bowels confined. He says the emetic acted like a charm in removing all his complaints; he threw up much nauseous, sourish viscid mucus.

℞. *Pulvis purgans, ut antea præscriptus, cras mane sumendus.* Diet, gruel.

Cases 3, 4, 5, 6.—H. M. S. Æolus, *August* 9, Mrs H. wife of another officer of the same ship as the former case, was similarly attacked at about the same hour. Her present symptoms are milder than his. About an hour after her attack two of her children, of the ages 12 and 6 years, were also seized; and late in the evening her husband Mr H. was suddenly attacked with greater severity than the others; (there seems no cause for this.) He was seized with the usual symptoms, attended with coldness, numbness, and weakness of the upper and lower extremities; his countenance is pale and alarmed, as if he had been informed that a fatal distemper has seized him.

Note.—The plan of treatment directed in the former case was also employed in these cases, and with the same result; it will not, therefore, be necessary to repeat the prescriptions in recording any case. But when infants were attacked they were immersed in the warm bath, which was prepared with facility; laudanum in brown sugar was employed instead of the pill; and the bowels were opened by powder of rhubarb and magnesia. The patients were generally discharged from the sick list on the third day after their treatment had commenced.

Case 7.—H. M. S. Poictiers, *August* 9, 8 A. M., Mrs L., of healthy constitution, and who is now in her 87th year, was suddenly attacked in the night with cramps in the abdomen, followed by nausea, retching, vomiting and purging of watery fluids; thirst; general uneasiness, and prostration of strength; symptoms are mild.—*Utatur remediis solitis.*

Cases 8, 9, 10.—H. M. S. Poictiers, *August* 9, 8 A. M. An infant aged 6 months, and a child aged 2 years, belonging to a seaman of this ship, were also suddenly attacked in the night.

Symptoms:—Crying; drawing up the legs; retching, vomiting, and purging of watery fluids; coldness of the body; shivering; skin cold; countenance pale and deadly.—*Utatur remediis solitis.*

M. A. C. æt. 12 an. daughter of an officer of this ship, was likewise suddenly seized in the night with pain in the epigastrium, without other symptoms; after remaining a short time it ceased.—*Nihil.*

Case 11.—H. M. S. Devonshire. *August* 9, 10 A. M.—S. C. æt. 55, seaman, went to bed in good health. At 4 o'clock this morning he was suddenly awaked by severe cramp in the epigastrium, followed by nausea, retching, shivering, and headach. In a few minutes after profuse vomiting and purging of watery fluids ensued, with sudden prostration of strength. These evacuations have ceased; but constant nausea and retching, with cramps in the abdomen, continue. Countenance pale and anxious; pulse regular, but weak; tongue white; great thirst; skin warm and moist. The cramps are stated to have been very severe. His wife says, that at the commencement his forehead was of an icy coldness, and a clammy moisture covered it. She has assiduously applied hot flannels to the belly, and given him warm drink.—*Utatur remediis solitis.*

Case 12.—H. M. S. Russell. *August* 9, noon.—J. P. æt. 33, seaman, of weakly constitution, went to bed in good health. At midnight was suddenly awakened by a coldness and numbness of the feet and legs, transient chilliness, and pain in the head. Cramp in a few minutes arose in the epigastrium, and soon became so violent that he bent his body double to obtain ease. A profuse discharge of watery fluids upwards and downwards next followed. Those dejected were of a black inky colour, while the fluids vomited were nauseous and sour. By the assiduity of his wife in applying hot flannels and giving him warm drink, he has been much relieved. The purging and vomiting have ceased, but the cramps frequently recur; urgent thirst; constant nausea; frequent retching of phlegm; voice feeble; urine sparing; features shrunk; tongue covered with a dirty white crust; skin warm and moist; pulse quick and weak; great debility.—*Utatur remediis solitis.*

Case 13.—*August* 10.—Mrs P. æt. 30, a robust woman, and wife of the above, was seized in the night with similar symptoms, but in a much milder degree.

Utatur pulv. Ipecac. ℈i. *ad vomitum ciendum.*

Note.—It sometimes happened, that, owing to the carelessness of the patient in employing the emetic, only a partial vomiting was excited, which relieved the patient without removing the cause. Hence on the 11th this woman stated, that she had only vomited slightly after taking the emetic, had thrown up alimentary and bilious matters, and the purging had ceased; but she had passed a restless night; a general uneasiness was hourly increasing, with strength diminishing; frequent slight cramps were felt in the epigastric region; nausea was constant, and thirst urgent; tongue covered with a brown fur.

Habeat pulv. Ipecac. ʒss. *quam primum aliaque remedia capienda sunt more solito.*

By repeating the emetic, the usual grayish-coloured slimy matter was ejected, and on the following day the woman resumed her customary occupations.

Case 14.—H. M. S. Clyde. *August* 10, 6 P. M.—Mr L. æt. 49, of healthy constitution, has had a relaxed state of the bowels for two or three days. At noon he ate his dinner, and had his usual appetite. At three o'clock was seized with giddiness, faintness, slight chilliness, and uneasiness in the epigastrium. Next arose successively partial and momentary chills about the loins; nausea, griping pains in the bowels, and cramps, drawing them into hard lumps; a sudden flux *per anum*, of a dark watery fluid, copious in quantity. By this time there was so much prostration of strength, that the patient with difficulty walked across his cabin. At this period I visited him, and found him pale, cold, with an alarmed look, restless; complaining of pains in the epigastrium, (not increased by pressure,) numbness of the left leg; pulse 66, very feeble and small; much thirst; skin cold and damp; tongue natural; voice faint; respiration free. A vomiting of alimentary matters, in a continuous and sudden gush, took place. Whilst waiting the cessation of this vomiting, notes were made of the case, and the usual directions given to his friends.—*Habeat remedia solita.*

August 11.—The emetic discharged nauseous slimy stuff, as the patient termed it; all the symptoms quickly ceased; the pill produced sound sleep, attended with a copious perspiration. Pulse 72; no particular complaint present.

Case 15.—H. M. S. Temeraire. *August* 14, noon.—Mrs N. wife of an officer, arrived in good health at 4 P. M. yesterday afternoon, from Portsmouth, with a child, coming by the steam-packet from London to join her husband, arose this morning with her usual feelings. At 8 o'clock when she sat down to breakfast, she found her appetite gone, and felt oppression at the epigastrium. This was succeeded by uneasiness, referred to the stomach, and occasional sensation of slight pain, while general indisposition and weakness hourly increased. At 12 o'clock sudden violent pain was felt in the epigastric region, and the patient complained of the sense of a ball rolling up the œsophagus. Next arose a general chill and nausea, retching, vomiting of a watery grayish-coloured fluid, with mucus of a peculiar nauseous sourish taste. Then followed distension and rumbling of the bowels, with a sudden profuse discharge *per anum*, of an amazing quantity of blackish watery fluid. At this moment when I was called, her strength was gone, the skin pale and dry, and the pulse weak, though regular.—*Utatur remediis.*

Case 16.—H. M. S. Redoubtable.—On August 5th three children on board this ship were attacked with cholera; on the 6th the parents; on the 7th three children of another family; on the 9th two children of a third family; and on the 14th G. K. subject of the present case. About this time the mother of the children attacked on the 9th went away, and was absent till near the end of August. On her return she had an attack of cholera.

August 14, vespere.—G. K. ship's boy, æt. 17, attacked an hour ago in the usual manner, is now lying with a sunken cadaverous countenance; skin cold; pulse 60, weak, and faltering, each pulsation threatening an intermission; cramp in the epigastrium; voice plaintive and feeble; occasionally vomits a whitish fluid; has been purged once; total prostration of strength; respiration feeble.—*Utatur remediis.*—Boy convalescent on the 16th.

Having exhibited a sufficient number and variety of cases to show the features of the late epidemic, and to serve for subjects of comparison with cases of cholera that may arise in other places, I beg here to remark, that the characteristic symptoms of the epidemic were seen in cases that occurred in November, December, and January of the present year, thus showing that a choleric disposition remains in this place.

Inferences.—Having, when in India in 1804 and 1805, witnessed the cholera then common, and when again there in 1821, seen the spasmodic cholera;—having also witnessed numerous cases of *cholera spontanea*, and *cholera accidentalis*, in various parts of the globe,—the opportunities of closely investigating the late epidemic, and the severe illness of my assistant and myself, have led me to draw the following conclusions.

1. That there is an identity between all the species of cholera; and that Cullen's Nosology needs no new genus.

2. That the *cholera Asiatica* or *spasmodica*, which commenced at Jessore in 1817, was a more severe form of bilious cholera combined with a peculiar poisonous *miasma*, which gave to the cholera an epidemic and contagious power.

3. That this miasm enters into the circulating system of all persons who are exposed to it.

4. That, owing to unknown peculiarities in the blood of different persons, its effects are seen in some and not in others.

5. That the difference of its effects in the persons on whom

it operates, and in the various places where it appears, are occasioned by the same constitutional peculiarities of individuals, and circumstances of time and of place, by which certain febrile diseases are modified.

6. That the blood of the portal veins is charged with the choleric miasm, which being eliminated along with the biliary elements, vitiates the bile at this time secreted, without either changing the sensible qualities of the bile already in the gall-bladder, or irritating the liver.

7. That this vitiated bile, if small in quantity, or owing to some of the circumstances before stated, 4, 5, passes imperceptibly away by the common *cloaca*, in some persons; whilst, under other circumstances, effects are produced in the ratio of the quantity and quality of the vitiated secretion; and, therefore,

8. That its effects vary from a simple irritation of the intestines to a *remora* of blood in the venous system, producing the blue cholera, and speedy death;—thus,

9. Indicating that this vitiated secretion acts on the ganglionic system of nerves as a sedative poison, and, locally, as an irritant.

10. As an uneasiness in the epigastrium, varying in degree and kind from simple distension by gas or fluid, of a certain portion of the intestinal canal, up to the most violent cramp, is one of the primary symptoms of cholera, it is probable that the *duodenum* is the seat of this disease; and as the evacuations from the stomach and intestines are often made in a manner so sudden and so profuse, as to resemble the gush of a river that has suddenly forced through its embankment, and as no rumbling and successive distension of the intestines precede these peculiar choleric evacuations, it may be inferred that spasms in the duodenum, and a closure of its orifices, are the first sensible effects of the vitiated secretion, which it is receiving direct from the liver. It is probable, that, from excessive distension of the duodenum, by exudation from its vessels, the spasms at its extremities are mechanically overcome, and a gush of fluid passes upwards and downwards, and is instantly discharged.

11. It seems probable that the inky-looking stools often passed at the commencement in the late epidemic consisted of watery fluid poured out by the exhalant arteries, (in consequence of irritation propagated from the duodenum by continuous sympathy along the intestinal surface,) and mixed with an exudation from capillary vessels carrying blood;—that the exhalants of the stomach poured out the fluids peculiar to themselves, and constituted the fluids vomited;—that the viscid, morbid, secreted matters, being adherent to the surface of the duodenum, and per-

haps also owing to this morbid secretion being still carried on by the liver, may be the cause of the renewed spasms;—and,

12. Retchings. A great congestion of blood in the veins of the portal system must necessarily produce a *remora* in the veins of the surface of the body, and thus give the appearance which the Russians termed *Choruaia Colezu;* others, blue cholera. At the same time, and from the same causes, a collapse must take place in the arterial system, producing a small pulse and cold skin. The shrinking of the features, the urgent thirst, the suppression of the urinary and other secretions, may all be the effects of two causes, namely, diminished arterial circulation, and a general excitement of the absorbents, from irritation on the inner surface of the small intestines, to which part all the fluids of the body now tend.

Pathology of Cholera.—Not having had an opportunity of making any *necroscopic* examinations of persons dead from cholera, I can only venture an opinion that the various morbid appearances found in the viscera were the effects of the previous morbid train of movements and derangements of the vascular system.

Treatment of Cholera.—Viewing the epidemic cholera as depending upon a vitiated bilious secretion of a peculiar kind, and possessing the properties of a sedative poison, and also considering that the evacuations so generally made by the stomach and intestines are the attempts of the *vis medicatrix naturæ* to free herself from the offending cause, it may be rational to infer that in this, as well as in the other species of the genus *cholera*, the disease is in numerous cases cured by the efforts of nature alone, in spite of the most adverse and varied plans of art.

In India I employed venesection, opium, calomel with opium, &c. and should then have shrunk with horror at the bare mention of employing an emetic in cholera. Now, however, from experience and reflection, and instructed also by the observations of the many able men who have written upon epidemic cholera, I venture to infer that the employment of emetics to produce full and complete vomiting, so as to discharge the vitiated secretions, will, under our present state of knowledge of the disease, be found in practice to be followed by great success. The other indications of cure would be, to restore the balance of the circulatory vessels; to remove spasm; and to counteract the effects of the disease,—all which would be effected by hot fomentations and frictions, opium with antimony, followed by a saline cathartic.

Note.—Should any case of cholera present itself in the stage of collapse and blueness, I propose employing the same plan of treatment as presented in the foregoing cases; combining, however, should it be found necessary, capsicum with the emetic, and using also the stomach-pump, *supra et infra*, and filling the alimentary canal with warm stimulant fluids. Some of the patients who suffered by the late epidemic here were affected for a few days before the attack by a relaxed state of the bowels. Although the disorder raged so extensively here, and I may also here add, among the inhabitants of Sheerness, yet neither at the neighbouring port of Chatham, nor other ports, was there any case of cholera, except such sporadic cases as usually arise at the summer and autumnal seasons of the year. Hence arises an important inquiry, whether this cholera was a native production, resembling the disease described by Sydenham anno 1669, *pravorum humorum,—pulsus parvus et inæqualis:* or, was it derived from the Riga ships, and a milder form of the malignant cholera?

Query, May not the blue cholera be a mixture of Asiatic cholera with the miasm of the Pestis of Turkey? May not the supposed vitiated secretion (*vide* inference 6.) undergo chemical changes in the duodenum?

Sheerness Ordinary, Feb. 4, 1832.

ART. IX.—*Observations and Cases illustrative of the Pathology of the Abdominal Viscera in some forms of Indian disease.* BY C. MOREHEAD, M. D. Bombay Medical Establishment.

DURING the monsoon of 1830 dysentery prevailed extensively amongst the European soldiery at one of the stations subordinate to the Bombay Government. I had then an opportunity of seeing many cases of the disease, and have selected the sixteen following casualties as the most interesting of those which fell under my observation. They appear to me to illustrate several points of interest in the pathology of dysentery, and of the abdominal viscera in general, some of which, as far as I know, have not as yet been much insisted upon. The observations which follow seem to be legitimate deductions from these casualties, and are meant only to apply to that form of the disease which I have myself seen.

I. The peritoneal covering of the large intestines almost invariably participated in the inflammation, and this inflammation seemed to arise simultaneously with that of the mucous membrane, and not to be the result of an extension of action from the one tunic to the other; because, 1*st*, The early symptoms were often rather to be referred to the peritoneum than to the mucous membrane; *2d*, In many cases in which the peritoneal covering had been inflamed, there was no thickening of the intermediate tunics of the bowel, or other evidence that they had been the medium through which the diseased action had been propagated.

II. When the peritonitis was not confined to the ulcerated bowels, but extended over the small intestines, then there was sufficient evidence, both from the morbid appearances and the symptoms during life, to show that this general inflammation of the peritoneum was the result of an action posterior in date to that of the primary disease.—(Cases No. 5, 7, 12.)

III. In none of the cases was there the acute pain so frequently observed in uncombined peritonitis. In some, indeed, there was little or no pain of abdomen; yet on dissection there was evidence that peritoneal inflammation had existed to no small amount.—(Case No. 1.) It is probable that, when pain and tenderness do exist in the course of the colon, that they are caused by the peritoneum being implicated in the disease.

IV. The omentum was in almost every case involved in disease. It was thickened in parts, vascular, fleshy, and in general adhered by these diseased points to the large intestines. It seemed in preference to adhere to that part of the intestines which was most diseased, and in which there was the greatest prospect of perforation. In some cases the omentum was found alone patching up a perforation in the bowel, in others assisting to do so, and frequently it was pulled from its natural situation, that it might be enabled to form these adhesions.

To act as a reserve tunic in cases of perforated bowels would seem to be one of the uses of the omentum.

V. In almost every case the colon was more or less displaced. The most common displacement was, that the commencement of the transverse arch was doubled upon itself and drawn down towards the *caput cæcum.* This seemed to be caused by the omentum dragged from its situation, and adherent to the *caput cæcum*, or hollow of the right *os ilium.* The *caput cæcum* was generally bound closely to the hollow of the *os ilium*, and the descending colon to the abdominal *parietes*; the sigmoid flexure frequently formed several folds in the pelvic region. It is probable, that, when displacements of the colon are found in inspections of casualties not immediately from dysentery, they have been caused by some former attack of the disease, and not by the mechanical action of feculent accumulations, as some authors, I believe, have supposed.

VI. Dysuria is a common and troublesome symptom arising in the course of dysentery. It sometimes amounts to retention, and requires catheterism for its relief. This symptom is generally caused by the fundus of the bladder forming adhesions with the arch of the pubis, the rectum, or some part of the colon. It is therefore sometimes partly caused by mechanical influence preventing free distension of the bladder, at others by the extension of the irritation. I may remark, however, that there occurred cases in which these morbid adhesions were found, but in which the dysuria had not been complained of, and also others in which the dysuria was troublesome, but in which the morbid appearance did not exist.

VII. Without any cognizable difference in the symptoms, the morbid changes of the intestines varied much. The disease principally affected the colon and the cœcum. The following were the most common morbid appearances of the mucous membrane. 1*st*, The mucous and muscular tunics abraded for a considerable extent, and nothing left but the peritoneal covering. 2*d*, The mucous tunic abraded, and the muscular fibres exposed, bare, healthy, and distinct. 3*d*, The mucous membrane thickened, and presenting for a large extent a rugged irregular surface, softened, broken down, and resembling the sides of a tubercular excavation or process of *rammollissement.* This state is in general attended with much thickening of the other tunics. I am inclined to think with Andral, that this thickened and frequently cartilaginous state of the intestine is produced by inflammation extending to the intercellular tissue, and causing deposition there. This view of the subject is supported by case No. 5, in which small purulent cysts were found in the thickened intercellular tissue. 4*th*, The ulcers are frequently circumscribed. When so, they are generally attended with thickening of the subjacent tunics at the site of ulceration. In some cases the ulcers seemed in preference to attack the *valvulæ conniventes*, in others to prefer the depressions between them. In some the ulcers seemed to be contracting and cicatrizing; in others they had perforated the intestine; in none had there been effusion of the contents of the bowel into the cavity of the peritoneum. In one case (No. 7,) apparently cicatrizing ulcers were covered with yellowish shreds, which adhered firmly to their surfaces. Were these sloughs, or may we not look upon them as something similar to the scab thrown out on a cutaneous ulcer, an effort of nature for their cure, a covering to protect their tender surfaces from irritating causes? In two cases (Nos. 5, 14,) there was granular effusion of lymph on the mucous surface. In case (No. 5,) the appearance of the ileum closely resembled that of case (90,) in Dr Abercrombie's work on the Pathology of the Abdominal Viscera. These two cases illustrate the well-known * fact, that the urgency of symptoms is by no means in every instance a just measure of the amount of morbid change. In the case reported by Dr Abercrombie, the whole disease forms but a trifling item in the extensive morbid changes in No. 5. Yet the former was far more urgent in its symptoms, and rapidly fatal than the latter.

---

* I have a distinct recollection of the morbid appearances in the case reported by

VIII. We have sufficient proof that dysentery is frequently combined with abscess in the liver, and that in general there are no symptoms by which this combination can be distinguished. In most of the cases in which abscess of the liver was found on dissection, there had been no symptoms distinctly referrible to disease of that organ, and in cases (No 4, 14,) in which there had been pain of the right hypochondrium, the liver was found comparatively healthy. I conceive the connection between the two diseases to be of the following nature. In some cases the liver disease has existed prior to the invasion of the dysentery, and has acted as a predisposing cause, and in the following way;—that a person affected with organic disease of any viscus is *cæteris paribus* less likely to resist the influence of the existing exciting causes of any disease than one in whom all the viscera are sound; and that this principle is more certainly true when the functions of the disorganized viscus are connected with the functions of those viscera most amenable to the influence of existing exciting causes. We may then consider the disorganizement of the viscus as a cause predisposing to the other disease. It is thus that I would look upon the connection of diseased liver with dysentery when the former has existed prior to the invasion of the latter. But doubtless, in many cases, the disease of the liver and of the bowels are of simultaneous origin, because it is probable that in many instances the exciting causes of both diseases exist at the same time. Many of the men who were cured of dysentery returned to hospital with diseased livers; and in these men the liver disease had either been latent during the more prominent symptoms of diseased bowels, or the state of the intestines had predisposed the liver to become diseased, just as I have endeavoured to show that the liver sometimes predisposes the bowels to become so. From the consideration of the casualties in any epidemic dysentery, we may be deceived, and led to conclude that the combination of the diseases exists much more frequently than it really does. It has been shown that there are no symptoms by which we can with probability determine the existence of the combination during the life of the patient, so that, generally speaking, the

---

Dr Abercrombie. The subject of it was under my care in the Royal Infirmary when I officiated as clinical clerk to Dr Alison.

cases of recovery cannot be taken into account. Again, those cases in which the combination has existed are most likely to prove the casualties, because the healthy action of the liver is intimately connected with the favourable progress of the dysentery. The appearance of biliary matter in the dejections is always a favourable symptom, and from the date of its occurrence we may anticipate with more confidence a favourable termination of the disease. Thus it is shown that in estimating the frequency of the combination that we must principally reason from the casualties, and it is also shown that the cases in which the combination exists are most likely to prove the casualties, so that, taking the average of the combination in the casualties, we are by no means furnished with data from which to estimate the average of the combination in the total amount of people diseased. I am aware that in the fatal cases of many epidemic dysenteries, liver disease has been found a rare occurrence. I would endeavour to reconcile these contradictory statements by supposing, that when liver disease is of rare occurrence in dysentery, the exciting causes of both diseases have not existed at the same time, and that, then, the combination will be found only in those cases in which the liver disease existed as a prior affection, and acted as a predisposing cause.

IX. The contents of the gall-bladder varied much in regard to quantity and quality; but the amount of deviation from healthy appearance did not in every instance bear relation to the amount of organic change in the liver. In case (No. 11,) the liver was completely changed in structure, and yet the gall-bladder contained good bile, and again, in other cases in which the organic change was trifling, the gall-bladder either contained tinged serum, or was nearly empty. It is probable that the aggravation of the dysentery bears relation to the manner in which the liver performs its function of secretion rather than in the actual amount of its organic change.

X.—We have every reason to believe that abscesses of the liver may be sometimes removed by absorption, and thus a cure be effected. This change probably only occurs in cases in which the abscesses are small. In several cases we found cartilaginous depressed cicatrices on the surface of the liver. In one case (No. 9,) in which the patient had laboured under hepatitis at a former period, the whole surface of the liver was covered with these cicatrices, and the organ was smaller than natural. The only way to account for these cicatrices is to suppose them produced by adhesion of the walls of small abscess cysts.

XI. It was a frequent occurrence to find the convex surface of the liver forming old adhesions with the diaphragm; and this appearance was invariably attended by a similar adhesion of the lower lobe of the right lung to the opposite surface of the diaphragm. Thus we have ample explanation of what have been called hepatic coughs, and of the other pectoral symptoms which sometimes arise to mark the diagnosis of hepatitis. We also see the futility of attempting in every instance to distinguish inflammation of the peritoneal covering of the liver from pleuritis. I am disposed to think that in the greater proportion of cases, inflammation of the pleura attends that of the peritoneum of the convex surface of the liver.

XII. The symptoms in the earliest stages of the disease were obscure, frequently only a sense of fulness in the course of the colon, with slight tenderness on pressure, and confined bowels. Patients who had these symptoms, if not actively treated by blood-letting, were soon seized with all the symptoms of acute dysentery. It was not often that we had an opportunity of seeing the men thus early in the disease. They generally came to hospital after having been ill two or three days, and then the symptoms, more properly called dysenteric, were fully formed. These early symptoms of sense of fulness of abdomen, slight tenderness, and confined bowels, I consider to be dependent on the peritoneal inflammation of the bowel. A full bleeding was sometimes sufficient to remove them, and then dysentery did not supervene. In many cases there was little or no febrile excitement; in few cases was there distension of the abdomen or vomiting. Upon the whole, it would appear that more can be learned of the favourable or unfavourable progress of dysentery from the inspection of the dejections than by any other means. 1*st*, Gelatinous-looking dejections, tinged with bile, were frequently observed, and looked upon as favourable. They apparently consist of mucus increased in quantity, but not depraved in quality, and probably most frequently occur in cases which have been seen rarely before the full formation of the symptoms, and which at that time have been actively treated, so that of the impending disease of the mucous membrane there only remains sufficient excitement of the vessels to increase the quantity of the healthy secretion. 2*d*, In some cases the dejections were watery, not scanty, passed without tenesmus, and not containing blood. 3*d*, The most unfavourable dejections were dark reddish-brown, watery, fœtid, and interspersed with white films: these occur generally in the latter stages, and in the worst cases. 4*th*, When the dejections become bilious, or mixed with feculence, then there is every reason to suppose that the disease will go on favourably. Case (No. 12,) is a striking and interesting example of the contrary; and shows that we should not consider our patient as safe till every trace of morbid secretion has disappeared from the dejections.

XIII. Concerning the treatment little need be said. Blood-letting to a large amount in the early stages was of paramount importance. Leeches and the warm-bath were useful auxiliaries. Blisters, in the more advanced stages of the disease, were of much utility. Mercury, generally in the form of calomel, combined with antimonial powder and opium, was freely exhibited, and always with the intention of producing ptyalism. After the exhibition of the calomel for two or three days, it was in general easy to determine whether ptyalism would be induced or not. In these cases the mouth became sore and dry, and then to push the calomel further was a measure rather injurious than otherwise. These cases were for the most part fatal. I recollect only two cases (No. 2, and 12,) in which free ptyalism was produced, and the disease proved fatal. In both of these cases the symptoms were alleviated, and in No. 12, there was convalescence for several days. These two cases are also interesting on another account. It has been stated by Mr Annesley that ptyalism never takes place when there is abscess in the liver. These two cases are ample contradiction of the statement. I am not prepared to enter into the discussion of the necessity of producing ptyalism to insure the full good effects of mercury in dysentery. It does not appear to me that we are entitled to conclude that the alleviation of symptoms is owing to the fact of ptyalism having been induced; its occurrence may be merely an index that the general system is in that state from which we may anticipate a favourable termination of the disease. True it is, that, in the present state of our knowledge, it is right to produce that effect upon the system which is generally attended with the alleviation of the symptoms of disease, though we are by no means prepared to say that the effect produced is the cause of the alleviation. I have never witnessed any bad results from the induction of ptyalism.

Case 1.—Private J. T——, æt. 26, of slight make, admitted into hospital May 30th 1830, had been ill two days before admission. Complained of tenesmus, and had frequen scanty dejections containing blood and mucus; no febrile excitement, nor tenderness of abdomen. Got gradually better and was discharged free of complaint June 14th. Readmitted June 18th, with the symptoms as before. No pain nor tenderness of abdomen. On the 22d had slight tenderness of righ iliac region, which was removed by the application of a few leeches. 20th, Complained of dysuria. 27th, Dejections brown and watery. He gradually sank without return of pain of abdomen, and died June 30th. No ptyalism had been induced.

Inspection.—There was evidence that extensive inflammation of the peritoneum had existed. The colon and rectum adhered to every organ in contact with them. The former to the under surface of the right lobe of the liver, and to the gall-bladder. The latter, by more recent adhesions, to the bladder of urine and the *symphysis pubis*. The large intestines throughout their whole course were thickened. The mucous membrane was much ulcerated, and had in many places a gangrenous appearance. The omentum was drawn down like a cord of small blood-vessels, and adhered firmly to the *caput cæcum*.

Case 2.—Corporal D——, æt. 37, admitted into hospital May 26th 1830, stated that he had been affected with dysenteric symptoms for four days before admission. Continued in hospital till June 2d, during which time the bowels were irregular, and the dejections dark-coloured. June 2d, Discharged free of complaint. Readmitted June 18th. Complained of tenderness of abdomen and tenesmus, and passed scanty dejections. These symptoms continued till 24th, when, on the occurrence of ptyalism, they were much relieved. Continued to improve slowly till July 1st, when he became unexpectedly somewhat delirious, sunk, and died July 2d.

Inspection.—The liver much enlarged, was of a dark reddish colour; its structure softer and more gorged with blood than in the natural state. In the right lobe there was a large abscess containing much thick pus. The gall-bladder was flaccid, and contained serum tinged with bile, and three earthy calculi, each the size of a nutmeg. The omentum was shrivelled up, very vascular, and connected by unnatural adhesions to many of the viscera. The mucous membrane of the cœcum was very vascular, and in many places completely abraded. The transverse arch of the colon was contracted; and there were many circumscribed ulcers on its mucous surface, bearing evident marks of cicatrization being in progress. At the sigmoid flexure the colon was dilated into several pouches, which lay above the small intestines in the hypogastrium, and contained much light-coloured feculent matter. The mucous membrane of these dilated portions was quite healthy.

Case 3.—Sergeant M. O——, æt. 32, admitted into hospital June 21st 1830. This man was a hard drinker, and was said to have been ill with dysentery for fourteen days before admission. Had much purging, with severe tenesmus and griping; dejections scanty, mucous, and bloody; tenderness of abdomen moderate. The dejections became red, watery, and fœtid; and for the last two days consisted entirely of grumous dark-coloured blood. He sunk gradually, and died July 2d. No ptyalism had been induced.

Inspection.—On opening the abdomen, a superficial abscess presented itself, situated on the superior surface of the thin edge of the right lobe of the liver, having for its walls posteriorly the liver, anteriorly the abdominal parietes, inferiorly the colon, extremely distended, and adhering to the margin of the liver. The abscess dipped down between the ascending colon and the concave surface of the liver, and then communicated with another abscess, which occupied the whole interior of the right lobe of the liver, and below it terminated in a large collection of matter behind the *caput cœcum.* The cœcum and ascending colon were internally of a dark-red colour, and filled with clotted blood; and in parts of the colon the peritoneal was the only covering left. The liver was light-coloured, and adhered to the right side, and to the diaphragm. Adhesions existed between the right lung and diaphragm, opposite to those of the liver, with the same muscle.

Case 4.—Private M. C——, æt. 28, admitted into hospital June 26th 1830, stated, that, for thirteen days before admission, had pain in epigastrium and right hypochondrium on motion and pressure. Bowels generally confined, but was purged on the 25th. The purging became more frequent; the dejections contained mucus and blood; they finally became watery, and of a reddish-brown colour. He sunk, and died July 5th. No ptyalism induced.

Inspection.—The colon distended; its peritoneal covering vascular, and forming adhesions; those between the cœcum and right iliac *fossa*, pale, and firmly organized. The omentum was very vascular, and adhered by one corner to the *caput cœcum* and right iliac fossa, so that the commencement of the transverse arch of the colon was drawn down towards the right iliac region, thus causing a turn in the course of that intestine. The ascending colon more diseased than the rest of the intestine, and adhering to the gall-bladder. The mucous membrane of the cœcum, ascending colon, and transverse arch, not vascular, but thickened, and presenting an irregular and softened surface, resembling the walls of a softened tubercular excavation. The liver was much enlarged, and contained much blood, but was free from adhesions or abscess. Gall-bladder full of bile.

Case 5.—Corporal C. W——, æt. 31, admitted into hospital July 8th 1830, was said to have been ill four days before admission. Had tenderness of abdomen, and frequent purging, attended with tenesmus; skin hot and dry. The tenderness of abdomen, never entirely removed, was much aggravated on the 14th. The purging continued frequent, and he died July 16th. No ptyalism induced.

Inspection.—The peritoneal covering of all the intestines and of the convex surface of the liver was vascular, and covered with flakes of effused lymph. The *caput cœcum* had formed firm adhesions; and, in endeavouring to separate it from the iliac fossa, its coats readily gave way. The disease of the mucous membrane commenced at the termination of the *ileum*, where there were several vascular patches covered with a slight effusion of granular lymph, but unattended with ulceration. In the cœcum and ascending colon the whole mucous coat was ulcerated and broken down, and the subjacent coats were much thickened with here and there a small encysted secretion of pus in their tissue. In the transverse and descending colon the ulcers were large, but circumscribed; of an olive-green colour in their centre, surrounded by a blush of redness, and uniformly attended with a thickening of the other tunics. The parenchyma of the liver of lighter colour than natural. The gall-bladder contained little bile.

(Thorax.) The pericardium adhered firmly to the diaphragm, and to the whole surface of the heart, from which it could not be separated without the knife. The heart was natural in size, but of darker colour than its usual tint. The mitral valves thickened and cartilaginous. The aortic valves in a similar state; and, instead of being applied to the sides of the vessel, projected into its cavity, leaving behind dilated pouches.

We have here evidence of extensive disease of the heart. There were no symptoms during the life of the patient to render it suspected.

Case 6.—Private J. C——, æt. 25, admitted into hospital July 6th 1830, complained of purging with tenesmus. The dejection contained mucus and blood. There was tenderness at the epigastrium and hypogastrium. These symptoms were never much relieved. The tenderness of abdomen was frequently complained of. Finally the purging became more frequent,—the dejection watery and fœtid. He sunk, and died July 19th.

Inspection.—Omentum and peritoneal covering of the intestines vascular; the former adhering loosely to the small intestines, and firmly to the right iliac *fossa*, so that the distended transverse arch of the colon was drawn down towards the right iliac region. The large intestines adhered to the abdominal parietes, the liver, pylorus, and urinary bladder. Their coats were generally thickened, more remarkably so where the mucous membrane was ulcerated. Ulceration of the mucous membrane was general throughout the colon, occupying principally the place of the membrane, and not observing any definite form.

The liver was enlarged, and of darker colour than natural. Its peritoneal coat in many places opaque and thickened.

Case 7.—Private W. H——, æt. 38, admitted into hospital July 14th 1830, stated that he had been ill two days. Had purging, with much pain and tenderness, in the course of the colon. Pulse full, frequent, and sharp. Was freely bled and leeched, and was free of pain for some days; but the purging continued, though attended with tenesmus. The dejections contained neither mucus nor blood, but were watery, light-coloured, fœtid, and filmy. On the 23d had again tenderness of belly. Symptoms continued unaltered. He died July 27th. No ptyalism induced.

Inspection.—Omentum adhered to both iliac *fossæ.* The peritoneal covering of all the intestines was vascular, and in some places covered with effused lymph. The ascending colon and commencement of the transverse arch adhered to the concave surface of the liver. The mucous membrane of the large intestines was ulcerated in many places. In the cœcum one ulcer had perforated the coats of the bowel, but effusion was prevented by adhesion to the abdominal parietes. Some of the ulcers had the appearance of commencing cicatrization, and were covered with firmly adhering yellowish shreds. In no situation were the coats of the intestines thickened; on the contrary, generally thinner than natural. Liver more compact and tougher than in the healthy state, and externally of an olive colour, with some points of purulent secretion in its substance. Gall-bladder shrivelled and nearly empty.

Case 8.—Private J. C. æt. 21, admitted into hospital July 5th 1830. Had been ill for upwards of a week before admission with severe pain in the region of the transverse colon. Dejections frequent, and contained mucus blood and a filmy matter. No ptyalism. Sunk slowly, and died July 22d.

Inspection.—Less peritoneal inflammation than is generally met with. Peritoneal covering of the liver thickened, but without adhesions. The gall-bladder had formed firm adhesions with the pylorus and ascending colon. The right lobe of the liver was occupied by a large abscess, consisting of ill-conditioned bloody matter, within a thick walled sac. The left lobe extended into the left hypochondrium, and adhered by their firm membrane to the tenth and eleventh ribs, answering most exactly to the situation of the pain complained of on admission. The gall-bladder contained a little thin orange-coloured bile. The colon was ulcerated throughout its whole extent, and in many places the ulcers seemed to be cicatrizing. The omentum, vascular and thickened, adhered closely to the cœcum and ascending colon, and when torn off permitted the escape of the contents of the bowel.

Case 9.—Private B. M.—— æt. 27, was admitted into hospital July 22d 1830. Had been in hospital ill with hepatitis from January 16th till January 24th. Had been well ever since till within the last three or four days. Since when, tender abdomen and purging of mucous and bloody dejections. Died August 6th. No ptyalism. Gums tender.

Inspection.—The whole omentum vascular, thick and fleshy; embraced firmly the colon from the cœcum to the sigmoid flexure, and on attempts being made to separate it the contents of the bowel escaped. In some places, where covered by the omentum, the natural coats of the intestines were entirely destroyed. All the intestines, great and small, were connected together in one mass, and adhered to the parietes of the abdomen. The liver was smaller than natural; its whole surface, both convex and concave, was covered with depressed and puckered cicatrices, which, when cut into, were found to be firm and membranous. The liver adhered slightly to the diaphragm.

CASE 10.—Serjeant J. P.—— æt. 22, admitted into hospital July 23d 1830. Had been ill with dysenteric symptoms for a week before admission. Belly tender; pulse full; dejections frequent and morbid. Had dysuria, ending in retention of urine, and requiring the use of the catheter. Died August 7th. Had been about a year in India, but never in hospital before.

Inspection.—The liver was much enlarged and extended considerably beyond the cartilages of the ribs. External surface without adhesions, but marked all over with small abscesses from the size of a horse bean to that of a pigeon's egg. Some of them only covered by the peritoneum, and others more deeply situated. The under surface of the liver was similarly diseased, more especially in the neighbourhood of the biliary ducts. The internal structure of the liver was also occupied by abscesses. Gall-bladder almost empty, and slight adhesions between it and the colon; ducts pervious; colon thickened and ulcerated throughout its course. The *caput cœcum* adhered firmly to the right iliac *fossa*, and when separated the contents of the bowel escaped. Rectum ulcerated; urinary bladder fixed by adhesions to the upper part of the pubis. There was less disease of the omentum and peritoneum than has generally been met with.

CASE 11.—Private M. R. ———, æt. 27, admitted into hospital July 19th 1830. Had been six months in India and never in hospital before. Had pain of abdomen and deranged bowels for some days before admission. On admission, tenderness of abdomen; skin hot; and pulse full; dejections frequent and morbid. August 6th, had slight pain of right side, but it was gone on the following day. Died August 11th.

Inspection.—Liver of the natural size, its whole surface rough, granular, and covered with healthy peritoneum. The internal structure occupied with numerous small abscesses the size of a hen's egg, and consisting of thin green watery pus. The parenchyma of the liver when cut presented a surface of bright gamboge yellow colour, and was found to consist of numerous small globules, each about the size of a pea, and confined to a distinct capsule, from which it could easily be picked out. In these capsules suppuration seemed to have commenced. The liver adhered above to the diaphragm, and the right lung to the opposite surface of that muscle. The gall-bladder full of dark bile. The omentum covered the whole surface of the intestines, and, where not inflamed, was thinner than natural, as if stretched. Fleshy and thickened at the points of adhesion, the omentum adhered to the cœcum and descending colon. When pulled away from the latter situation it was found that the coats of one side of the descending colon were completely removed, and that the loss had been supplied by the omentum and abdominal parietes. The sigmoid flexure formed two or three folds in the cavity of the pelvis, and at the angle of each fold the coats of the intestines were destroyed on one side for the extent of the size of a dollar; the loss being supplied on the opposite side of the folds by the omentum. The urinary bladder formed the wall of one perforation the size of a dollar.

The liver in this case is an example of the degeneration called *cirrhosis*. I do not, however, recollect any case in which the colour was of the bright yellow so remarkable in the one now reported.

Case 12.—Private W. H——, æt. 43, admitted July 22d 1830. Had been ill one day before admission. Much tenderness of abdomen, extending across the lower part of the epigastrium; dejections frequent. Was freely bled and leeched; and the pain left him; and the dejections became bilious, and did not contain blood. On the 25th, ptyalism. 28th, Medicines omitted; he seemed to be convalescent, and the dejections were natural. From the 1st August till the 10th the dejections continued feculent and formed, with occasionally, however, some drops of reddish mucus passed with tenesmus. On the 10th the purging and tenesmus increased, and the dejections became more morbid and the abdomen tender. From this time all the symptoms became aggravated. Ptyalism could not be again induced, and he died August 26th.

Inspection.—Omentum shrivelled up and laid upon the transverse colon, which intestine throughout its course adhered to the abdominal parietes, and to the great curvature of the stomach, following its cardiac extremity, and adhering to the diaphragm on the left side. On the right side the transverse colon adhered to the concave surface of the liver, and firmly to the gall-bladder. The coats of the bowel were thinned, and in some places perforated; the gall-bladder, for example, formed the wall of a perforation. The ascending and descending colon were ulcerated internally, of rather contracted calibre, and adhering firmly to the parietes of the abdomen. When in some places these adhesions were separated, the contents of the bowel escaped. The peritoneal surface of the small intestines was of a dark red colour, with here and there patches of effused lymph. The left lobe of the liver was small, hard, and carneous. The right lobe not so hard, but mottled, and containing many small abscesses in its structure, none of them larger than a horse bean. No adhesion of the external surface of the liver, but in some places there were depressed and puckered cicatrices. The coats of the different vessels in the substance of the liver seemed thickened, and felt cartilaginous and hard under the scalpel. The gall-bladder contained thin watery bile. The lung on the left side adhered to the diaphragm opposite to the adhesions formed between that muscle and the colon.

Case 13.—Private B. A., æt. 21, admitted into hospital August 1st 1830, had griping and dejections containing mucus. On the 3d, when the gums were tender, the dejections became bilious and feculent, and continued so till August 17th, with, however, irregular action of the bowels, and occasional griping; but no tenderness of abdomen, and no febrile excitement. On the 17th blood was observed in the dejections. From that date the symptoms became aggravated. The dejections, however, retained their bilious colour, but contained blood and vitiated mucus. No ptyalism. Died September 8th.

Inspection.—The liver had formed no adhesions; was of a slate colour externally, somewhat enlarged, and extending beyond the cartilages of the ribs. Near the thin edge of the left lobe there was an abscess, yellow, elevated above the surface of the liver, about the size of a hen's egg, and containing thick purulent matter. The liver was hard in structure; and the gall-bladder was full of dark bile, and had formed firm adhesions with the colon and the pyloric portion of the duodenum. There was less peritoneal inflammation than is generally met with; the omentum was vascular, but had contracted few adhesions. The *caput cæcum* and ascending colon were distended, hard, and thickened; the former was drawn upwards from its usual situation in the hollow of the *os ilium*. The mucous membrane of the large intestines ulcerated, but in no situation was there any trace of perforation.

Case 14.—Private J. A. æt. 35, admitted into hospital

July 8th 1830, ill with dysentery, suffered from an acute attack, and was discharged cured July 31st. Readmitted August 10th with tender abdomen and other dysenteric symptoms. No ptyalism induced. Discharged cured September 18th, after having been in hospital a long time convalescent. Readmitted on September 23d with the abdomen tender, and frequent purging. Complained of pain of the right hypochondrium; for the first time was subjected to the usual treatment; no ptyalism. Died October 1st.

Inspection.—Much fat in the omentum and about the mesentery. The omentum adhered slightly to the intestines. The small intestines had a blush of redness on their peritoneal surface. The *caput cœcum* was drawn upwards from its usual situation in the iliac *fossa.* The colon was thickened, covered with fat, and firmly adherent to the *fundus* of the gall-bladder, which latter organ adhered also to the pyloric portion of the duodenum. The transverse arch was closely connected to the stomach. The sigmoid flexure formed several folds in the hypogastrium, and the sides of the folds formed adhesions with each other. The mucous membrane of the large intestines was discoloured and ulcerated, and when floated in water, exhibited a flocculent surface. Where less diseased there was a granular white effusion on the vascular mucous surface. Liver rather enlarged and of lighter colour than natural. No adhesions. Thorax healthy.

Case 15.—Private J. P. æt. 31, of leucophlegmatic habit, admitted into hospital June 27th 1830 with ophthalmia, which terminated in obstinate opacity of the cornea, with intestinal ulceration. While under treatment for ophthalmia, he complained for the first time of dysentery on the 9th October; but it was ascertained that he had been ill for the two previous days. The symptoms were urgent; the dejections very frequent, mucous, and bloody, passed with griping and tenesmus; and there was tenderness in the course of the colon. The skin was hot and dry, and the pulse frequent. Was treated in the usual way. No ptyalism. Died October 15th.

Inspection.—The omentum spread over the intestines adhered firmly to the cœcum, where that intestine was united by unnatural adhesions to the iliac *fossa;* at the points of adhesion the coats of the cœcum were black and tender. The coats of the large intestines, which were in general thickened, were at the upper portion of the ascending colon quite cartilaginous. The mucous membrane was ulcerated; the ulcers numerous, defined, and deep. The liver was natural in size, but hard and much mottled. There were few adhesions; but the peritoneal covering of the organ was thickened and of pearly colour. Old firm adhesions attached the gall-bladder to the colon. Around the situation of the gall-bladder and elsewhere the liver had a puckered depressed appearance, as if from the adhesion of the surfaces of the cyst of an abscess. In these situations the structure of the liver was almost cartilaginous. At one side of the gall-bladder a thin layer of the liver was prolonged for a short distance over the free surface of the bladder. The gall-bladder contained numerous earthy concretions. In the chest the costal and pulmonic *pleuræ* were connected by old adhesions.

CASE 16.—Private D—— æt. 35, October 1830. The subject of this case was a very steady soldier, who had served in India for some time at different periods. For upwards of a year before his death he had been almost constantly in hospital, affected with symptoms either of hepatitis or dysentery. Latterly the right hypochondrium was much enlarged, and fluctuation could be indistinctly felt. The operation of puncturing the abscess, which did not seem to hold out any prospect of success, was not performed; and the patient sunk and died.

Inspection.—The liver was much enlarged; it occupied completely the *epigastrium* and both *hypochondria*, extending across the abdomen, and with its lower edge on a line with the last false ribs. The principal part of the right lobe was occupied by one large abscess, with the sac lined by a firm membrane, and containing three pounds of purulent matter of different consistence; the uppermost being little more than serum, and that which was in contact with the dependent part of the sac thick and consistent. The rest of the liver was mottled, harder, and whiter than natural. The convex surface adhered firmly to the sides and to the diaphragm, and where the most superficial points of the abscess had been there were the adhesions firmest. The intestines were healthy, with the exception of some faint marks of cicatrization on the mucous membrane of the colon. The right lung adhered to the diaphragm opposite to the adhesions of the liver. The other organs were sound.

CASE 17.—Private P. L.—— æt. 45, had frequently been a patient in the hospital of the Bombay European Regiment with symptoms of dyspepsia. Was admitted for the last time April 13th 1829. He then complained principally of flatulence and debility; seldom had pain of abdomen; and when he had it was generally removed by carminatives and other remedies of that description. He gradually became emaciated without the symptoms becoming more distinct. Finally diarrhœa came on; dejections of dark colour. He sunk slowly, and died October 29th 1829.

Inspection.—The transverse colon was much distended, except at its middle portion, where it was a good deal contracted;

its peritoneal surface was of a dark colour, but there was no effusion of lymph or other evidence of inflammation. The coats of the large intestines throughout their whole course were much thickened, and of increased hardness. The mucous membrane was of a dark colour, in some places almost black, and presented a very irregular surface, which was caused by numerous small globular bodies, each about the size of a pea; they were hard in consistence, of a colour almost black, and were apparently situated in the cellular tissue, subjacent to the mucous. Throughout the whole course of the large intestines there were no traces of ulceration. The stomach was small, and owing to the distension of the colon, was forced upwards, and more to the left side than in the natural state; but its coats were free from disease. The small intestines were healthy; the liver of light colour without, and with tubercles the size of cherry-stones in its left lobe. With the exception of old costal adhesions, the thoracic viscera were healthy.

This was a case of melanosis, and illustrated the obscure and tedious progress of that morbid lesion, and also its tardiness to run into a state of ulceration.

Case 18.—Private William J——, æt. 29. Admitted into the hospital of the Bombay European regiment, Oct. 28th 1829, ill with fever. There was much headach, with full and frequent pulse. He became drowsy, the skin assumed a yellow tint, and he sunk, and died November 1st. On the 29th, he shrunk on the abdomen being pressed; but there was no purging except from the use of medicine.

Inspection.—Vascularity of the membranes of the brain, and effusion of patches of lymph. The greater part of the mucous surface of the large intestines was covered with a dark-red effusion, in some places loosely attached to the membrane, and having the appearance of red currant jelly; in other places the effusion was firmer in consistence, and could be peeled from the mucous tunic in an almost membranous form. In the cœcum the effusion was evidently of longer standing, from its firmer consistence, and from its being connected with the subjacent mucous tissue through the medium of what appeared to be small capillary vessels. The mucous membrane underneath the effusion was vascular.

I have reported this case on account of the interesting appearance of the mucous membrane of the large intestines. There were no symptoms to lead us to suspect disease there. The case probably illustrates the manner in which those tubular membranes, often discharged by stool in dysentery, are formed. It is a process similar to that which takes place in some diseases of the bronchial mucous membrane.

ART. X.—*Eighth Report of the Edinburgh Surgical Hospital, from 8th August* 1831 *to 8th February* 1832. By JAMES SYME, Esq. F. R. S. E.

REPORTS of hospital practice may be employed both to acquaint the profession with interesting facts, and also to communicate the author's opinions as to the treatment of disease. The former Reports of the Surgical Hospital have been written with the view of attaining both of these objects; but as I have lately offered to the public a systematic work on the Principles of Surgical Practice, it will for the future be unnecessary to do more than state the remarkable features of the cases that may come under treatment. Hitherto these reports have been drawn out at the time to which they were brought up, whence it has repeatedly happened that imperfect accounts of cases have been given, and sometimes opinions stated as to their probable result, which have not proved correct. In the last one it was mentioned that an old man of 80, who had been cut for stone, was likely to do well. Such was the opinion then entertained by myself and pupils who had attended him; but soon after the paper had gone to press, he suddenly died, three months after the operation. The young man Ford, too, whose case was related in the same Report, though he left the Hospital in greatly improved health, and with the prospect of recovery from the disease of his lungs, which had made us decline cutting out the elbow-joint, and hesitate as to performing amputation of the arm, died much about the same time with the last-mentioned patient. It therefore seems right to allow the longest interval to elapse between the date of the conclusion of the reports and their commission to the printer, that the arrangements of the Journal permit.

Since the date of last Report, 1254 cases of surgical disease have been presented at the Hospital. Of these 164 have been admitted into the house, and the remainder have been treated as out-patients.

OPERATIONS.

	Name of Patient.	Age.	Cured.	Not Cured.	Died.	
Amputation of thigh, -	Alex. M'Kinnon,	34			1	(*a*)
———————— -	Alex. Clarke, -	18	1			
———————— -	Andrew Ferrier, -	35	1			
———— leg, -	John King, -	21	1			
———————— -	Margaret Mackenzie,	8	1			
———————— -	William Burnett,	26			1	(*b*)
———— finger,	David Lamb, -	14	1			
———————— -	Robert Wilson, -	30	1			
———————— -	John Welsh, -	50	1			
———————— -	Helen Cameron, O.P.[*]	25	1			

---

[*] *Those marked* O. P. were out-patients.

Supernumerary fingers,	Anne Milne, O. P.	4	1 cur.	not cur.	(*c*)
Amputation of toe, -	David Syme, -	9	1		
——————— -	Thomas Dick, -	23	1		
Cancer of cheek, -	Alex. Clarke, -	77	1		
——— lip, -	James Brown, -	24	1		
—————— -	John Graham, -	52	1		
Excision of elbow-joint,	James Hastings,	10	1		(*d*)
——— fatty tumour,	Jane Lawson, -	37	1		(*e*)
—————————	Eliz. Rowan, O. P.	43	1		
——— mamma, -	Mrs Straton, -	57	1		(*f*)
——— encysted tumours, -	Arch. Craig, O. P.	14	1		
—————————	Nugent Reynolds,	50	1		(*g*)
—————————	James Hutton, O. P.	22	1		
—————————	William Henry, O. P.	15	1		
—————————	Jane Lyall, O. P.	7	1		
——— testicle, -	David M'Naught,	48	1		(*h*)
——— tonsil, -	Isabella Massey, -	13	1		
——— upper jaw bone, -	Betsy Lees, -	28	1		(*i*)
——— excrescence of uterus, -	Mrs Mackenzie, -	48	1		(*k*)
Ectropium, -	William Murray, -	12	1		(*l*)
Entropium, -	Isabella Weepers, -	18	1		
Fistula in ano, -	Thomas Gillespie,	36	1		
—————— -	Margaret Paterson,	23	1		
—————— -	James Trainer, -	39	1		
—————— -	William Lawson, -	24	1		
—————— -	James Millar, -	23	1		
—————— -	Thomas Guthrie, -	31	1		
—————— -	Robert Hastie, -	22	1		
—————— -	Andrew Dowie, O. P.	55	1		
—————— -	W. M'Ghie, O. P. -	34	1		
Hemorrhoids, -	Francis Gloag, -	30	1		
—————— -	George Anderson,	27	1		
Hare-lip, - -	Andrew Turnbull,	11$^{ms.}$		1	(*m*)
Hydrocele, - -	David Hunter, -	70	1		
———— - -	James Russell, -	30	1		
———— - -	Thomas Smith, -	30	1		
——— of cord, -	James Kennedy, -	24	1		
——————— -	John Burgess, -	28	1		
——————— -	Duncan Knox, -	48	1		(*n*)
Nævus maternus, -	Agnes Geddes, -	10$^{ms.}$	1		(*o*)
Polypus nasi, -	David Thomson, -		1		
—————— -	Thomas Wood, -	15		1	
—————— -	Thomas Berry, O. P.	40	1		(*p*)
—————— -	P. M'Donald, O. P.	40	1		
——— auris, -	Andrew Robb, O. P.	19	1		
Warty excrescences, -	John Fleming, -	42	1		(*q*)

(*a.*) M'Kinnon had for 17 years laboured under disease of the knee-joint. The bones were anchylosed, but a sinus which opened a little above the patella led directly down into a large carious cavity in the thigh bone. He was a very unhealthy-looking man, having the complexion and expression of countenance usually observed in persons who have suffered long from diseases of the *bones*; and after his admission had repeated feverish attacks, attended with dry brown tongue. It was evident that the only mode of affording him effectual relief was to amputate the limb; but the circumstances just mentioned rendered this proceeding very unpromising, both as to its immediate and also its secondary effects, in case the patient should escape the danger of the former. The operation, therefore, was not recommended, but left to the choice of the patient, who decided upon submitting. It was performed on the 14th of September, and though the cure was tedious, it seemed to be at length completed. He walked about on crutches, and would have returned home, but as it was at a great distance, he was detained in order that his strength might be increased sufficiently for supporting the fatigues of the journey. On the 1st of November he had an attack of fever similar to those which he experienced previous to the operation, but more severe, and sunk under it on the 14th.

A very similar case occurred about the same time, in which, if amputation had been performed, as the patient most eagerly desired, the result could hardly have been more satisfactory.

Peter Fortune, aged 32, had been afflicted with necrosis of the shaft and caries of the condyles of the thigh-bone for twenty years. He had been admitted into the Royal Infirmary when a boy; and the surgeons then declared amputation the only remedy, but declined to perform it on account of the height at which it would have been necessary to remove the limb. He presented himself at the Surgical Hospital on the 9th of August.

He was of small stature, and had a remarkably thin withered appearance. His hair was thin, and his shrivelled leathery-looking features exhibited the wrinkles of premature old age. Two days after his admission he had an attack of fever and erythema, from which he seemed to be recovering, having regained his appetite, and displayed other indications of convalescence, but relapsed on the 24th and died on the 29th. The pericardium was found distended with sero-purulent fluid, and coated with recently effused lymph.

(*b.*) Burnett was, if possible, a still more unfavourable subject for operation. For five or six years he had been constantly under medical treatment; at one time for chronic inflammation of the peritoneum—at another for palpitation of the heart—and for several months he had been an out-patient of the Hospital on account of disease in his foot, knee, and wrist. His general health became considerably improved, and his local complaints seemed also to be in the way of improvement, with the exception of his foot, which swelled to a great size, suppurated in several places, and when the matter was evacuated, the bones were felt extensively denuded. He complained of severe and incessant pain, which prevented him from sleeping, except when under the influence of the muriate of morphia.

In short, he felt persuaded that the disease would certainly prove fatal before long, and therefore desired to be relieved from it, whatever might be the danger of the operation. It was performed on the 24th of January. The tissues of the limb were observed to be soft and loosely connected. Great difficulty was experienced in arresting the hemorrhage. The stump sloughed. No effort at reparation took place after the dead parts separated; and the patient, who preserved his appetite and confidence almost to the last, at length sunk under his sufferings on the 7th of February. On dissection, the peritoneum was found almost everywhere studded with small tubercles, and having its surfaces generally adherent. The lungs were thickly interspersed with small tubercles. The wrist was filled with pus; and almost no part of the body presented the appearance of healthy structure.

(*c.*) These fingers, which were small and imperfect, adhered by a narrow filamentous-looking attachment to the integuments covering the ulnar side of the metacarpal bone of the little finger of each hand.

(*d.*) In this case of diseased elbow, the humerus was principally affected. The boy, who came from Arbroath, was admitted on the 16th of November. There was a large opening at the inner side of the joint, which led directly down to the bone. The elbow was much enlarged, stiff, and painful. The disease was referred to a fall sustained ten months before.

The operation was performed on the 22d. A large carious cavity was found to occupy the internal tuberosity and neighbouring part of the humerus, the whole of which part, together with the extremities of the other articulating bones, was removed by successive applications of the cutting-pliers. The patient suffered so little constitutional disturbance, that he could not without some difficulty be persuaded to remain in bed. The wound healed kindly; and he would have made a very satisfactory recovery, had he not been exceedingly wilful, and obstinately resisted every effort to exercise the mobility of the uniting medium. The arm is nevertheless strong, and useful for all ordinary purposes: and there is reason to expect that the degree of motion will become much increased. The boy Arnot, who had his knee-joint cut out two years ago, and who on recovering from the operation, possessed hardly any mobility of the limb, which had been purposely kept still, is now able to bend the leg almost to a right angle with the thigh.

(*e.*) This tumour was seated on the upper and fore part of the arm, close to the axilla. It was about the size of the largest pear, which it also resembled in figure, and had existed for thirteen years. The patient had never suffered much inconvenience from it, until within a few weeks of her admission, which was on the 22d of January, when a small superficial sore formed at the most dependent part of the tumour, and became the seat of unceasing intolerable pain. Though previously very averse to suffer an operation, and then unfavourably situated for undergoing one, being a nurse at the time, she readily consented to have the tumour removed, which was done without disturbing the secretion of milk. When a section was made through the sore and subjacent structure, a distinct but very superficial carcinomatous degeneration was observed.

(f.) This case was very unpromising, so far as regarded the appearance of the tumour. It was of a very large size, weighing, after its removal, 4½ pounds; unequal surface; purple colour; and very soft consistence at the most projecting parts. But there were other circumstances in its history of a more favourable character. It had existed fifteen years; there was no enlargement of the axillary glands; the tumour felt firm and quite circumscribed at its base; and the patient's general health was excellent. She was very fat, but active and vivacious. The operation was performed on the 11th of August, and the patient was dismissed nearly quite well on the 9th of September. The thickness of the adipose tissue rendered the recovery more tedious than it promised to be at first. She has enjoyed perfectly good health since, and there is not the slightest appearance, local or general, that would lead to the apprehension of a relapse. The tumour, when divided, presented the characters of medullary sarcoma; but the intersecting fibrous bands were firm and broad in proportion to the pulpy substance.

In November, I removed a similar tumour, weighing 5½ pounds, from Mrs F. aged 34. She was a little thin woman, which made the enlargement seem greater than it really was. It had existed upwards of seven years, and latterly increased very rapidly. It was very soft at the projecting parts, discoloured on the surface, and adherent to the pectoral muscle. There was no disease of the glands, but the tumour extended into the axilla, nearly to the clavicle. The base felt firm, tuberous, and distinctly circumscribed. It was found necessary to remove a very large portion of the integuments, which were thin, discoloured, and adherent; and also a great part of both pectoral muscles, so that the cartilages of the ribs were completely denuded to a considerable extent. The tumour, when divided, displayed the characters of medullary sarcoma. The patient made an excellent recovery, and never suffered the slightest constitutional disturbance. She continues to enjoy perfectly good health.

The circumstances that encouraged me to operate in these cases were the slow progress of the disease, the good general health of the patient, and the firm, circumscribed base of the tumour. Being consulted lately by a lady who wished to be relieved from a small medullary tumour of the breast, I declined, because, though it was not adherent to the muscle, and there was no affection of the glands, the disease threatened to throw out a fungus, and no distinct outline could be felt at its base.

(*g.*) This man came all the way from Londonderry in the north of Ireland, on account of a small tumour under the edge of the jaw. It felt like an enlarged gland; and the circumstance of his having had a sore extirpated from the lip, increased the probability of its being one. The equality of its surface and its mobility led me to entertain some doubts on the subject, and as the patient eagerly desired to be relieved from what was a constant source of uneasiness and apprehension to him, I cut out the tumour,—in doing which it was necessary to divide the facial artery; it was then found to be a cyst containing a mixture of meliceratous and steatomatous matter, with small hairs interspersed.

(*h.*) This man was admitted on the 10th of December on account of a swelling which seemed to depend on hydrocele, but presented a remarkable peculiarity of figure, in so far that its longest diameter was transverse and directed from before backwards. In order to examine the state of matters more thoroughly, the fluid was drawn off by means of a small trocar. It was dark-coloured, and similar, the patient stated, to what had been withdrawn once before, though a clear fluid had previously been taken away. The testicle was much enlarged, and a distinct fluctuation was felt at its anterior part. Soon after he went to bed the scrotum began to swell, and in the course of four hours attained to more than double the size of a child's head. As it was then necessary to make a free incision to remove the effused blood, and apply the means for suppressing its farther flow, I thought it right, at the same time, to remove the testicle, the extirpation of which had been decided by the examination that had been made, and was delayed only until the necessity for its performance could be explained to the patient. No troublesome consequence followed the operation, and the patient was dismissed on the 18th of January. The testicle, when divided, was found to display a cystic structure, and the source of the bleeding proved to be an artery lying on the *tunica vaginalis.*

(*i.*) This woman came from Galashiels on the 24th of January to be relieved from a tumour of the upper jaw, which presented a formidable appearance. It was about the size of an egg, situated on the left side, and extended from the centre of the alveolar arch backwards. It elevated the cheek and depressed the palate. It had a soft consistence, and at the anterior part, where a puncture had been made in the country, protruded a small dark-coloured fungus. The patient was stout and healthy-looking.

This seemed a very proper case for cutting out the superior maxilla, and the operation was accordingly performed on the 6th of February. Having exposed the anterior surface of the tumour by raising a flap from the cheek, I divided the nasal process of the maxillary bone, the connection with the malar, the septum of the nose (it being necessary to remove more than half of the palate) and lastly the palate, with cutting-pliers. I then attempted to depress and twist out the bone, but the morbid degeneration, which possessed the characters of medullary sarcoma, had rendered it so soft and yielding that the anterior half only came away. The condition of the patient was then truly alarming, since the hemorrhage was not only profuse, but threatened instant suffocation. There being no time for hesitation or gentle measures, I seized the remaining portion of the bone between the last grinders with a pair of strong pliers, and forcibly wrenched it out, together with the palate bone and pterygoid plates of the sphenoid, when a sponge having been thrust into the cavity, the patient was safe.

An hour after the operation hemorrhage occurred from the palatal artery on the *right* side, and rendered it necessary to undo the wound, and surround the vessel with a ligature passed under it through the palate by means of a curved needle. The cavity was then, as before, stuffed with pieces of caddis, and the edges of the wound stitched together, pins being introduced at the points where the two incisions of the cheek intersected the lip. Union by the first intention took place throughout the whole extent of the wound, and the patient might have returned home in a very few days. She remained, in order that we might observe the process of recovery a little longer.

At first there was œdema, and paralysis of the cheek, which rendered articulation and mastication difficult. The parts have now become very firm and contracted, so that there is hardly any deformity, or inconvenience of any kind, and she has gone home.

(*k.*) Dr Farquharson asked me to see this case. The tumour was the size of a uterus at the fifth month of pregnancy, which it very much resembled in appearance. It descended by a narrow neck from the uterus through the vagina, which, when carefully examined, seemed to be perfectly sound, and swelled out beyond the external orifice. At the fundus or lowest part there was an ulceration which threatened to slough. In other parts the tumour could be freely handled without causing pain, and felt of an equable and rather firm consistence. The patient first noticed the swelling three or four years ago; it grew slowly, but could always be readily pushed back into the vagina when it protruded externally, until a week or two before, when she requested Dr Farquharson's assistance; since then it had been quite irreducible, and become considerably larger.

Dr Mackintosh having concurred with Dr Farquharson and myself as to the propriety of removal, I performed the operation on the 25th of December. The woman being placed in a convenient position, I transfixed the neck of the tumour with a needle, and introduced a strong double ligature, one-half of which was tied above and the other below with all the force I could exert. When the needle was introduced, such a gush of arterial blood issued from each of the orifices, as showed the necessity of caution. There being now, however, no fear of any great hemorrhage, the neck of the tumour was cut through with a bistoury a little below where it had been tied. A small jet of blood towards the centre of the cut surface showed that the constriction did not operate there with sufficient force. The part whence it proceeded was therefore transfixed with a pin, round which a thread being tied, the bleeding was completely checked. The patient made no complaint during or subsequent to the operation; she felt quite well in a few days, and has continued so ever since. On examination, no trace of the tumour can be perceived. When divided, the morbid growth displayed the characters of simple vascular sarcoma.

(*l.*) In this case the upper eyelid was completely everted, in consequence of a lacerated wound which had extended from near the inner angle upwards to the forehead, and by its contraction during the process of cicatrization, caused the displacement which required remedy. The eyelid was again divided perpendicularly, nearly in the situation of the former wound, and the swollen everted conjunctiva being then cut away, the edges of the incision were placed in proper position, and retained together by a couple of stitches, after which a compress of caddis was applied, to afford additional support. He was dismissed with very little deformity remaining.

(*m.*) This case deserves to be mentioned as affording a useful caution. The patient had been brought to the Hospital some months previously, when his mother was instructed to return with him when he was weaned, and had cut his front teeth. The operation was performed as usual, and succeeded perfectly. The needles were taken out on the fourth day after it, and a strap of plaster was then applied, so as to approximate the cheeks, and prevent any strain on the recent union. Two days after this the mother became anxious to return home, and as the lip seemed quite firm, the strap was taken off, and permission given for her departure. In the course of the day, however, before she left the house, the child being seized with a fit of crying, a small fissure was formed at the margin of the lip, and notwithstanding the means immediately employed by the house surgeon to prevent its extension, soon reduced the lip to its original state.

(*n.*) The sac in this case being very small, not larger than a small walnut, the treatment by seton was thought preferable to injection. A silk thread was passed through the anterior parietes, and allowed to remain until sufficient irritation seemed to be induced. The subsequent process of recovery was similar to that which occurs after injection.

(*o*.) The nævus was seated in the neck. It was round, of considerable thickness, and the size of a crown piece. It had repeatedly bled so profusely as to alarm the mother for the safety of her child, which was in other respects, though one of twins, healthy and thriving.

A long needle, slightly curved, was passed transversely under the base of the disease, and two threads introduced by it were then tied, so as to include one-half in each. As a small part of the disease slipped behind the thread, a needle was thrust under it, and held there until the ligature was drawn tight. No troublesome accident succeeded. The sloughs separated, and the ulcerated surface healed under the use of lotions containing the sulphate of copper, and the acetate of lead.

(*p*.) The patient, who came from Glasgow, laboured under a complete obstruction of the right nostril, though the anterior and upper part of the nasal cavity, so far as could be seen or felt, seemed nearly free. Having carefully groped backwards with a pair of small forceps, and extracted the small portion of polypous substance that was encountered, I at length detached a large round tumour which had hung backwards. It fell down into the pharynx, whence the patient spat it up, and was instantly relieved from all the annoyance he had previously suffered. A similar occurrence happened a short time before in private. In operating on a gentleman, whose nostril was completely obstructed, I found the passage so extremely narrow, that the smallest instrument could with great difficulty be either introduced or slightly opened, and I was about to despair of removing any thing more than a few small fragments, when the patient suddenly ejected from the pharynx a round mass fully the size of a walnut, and instantly felt quite well.

(*q*.) The patient was a respectable married man; a mason by trade. He applied on account of a great number of large warty excrescences which completely surrounded the anus, and presented a precisely similar appearance to that observed in aggravated cases of warty growths from the prepuce, and genital organs of the female. He had suffered great distress from the disease, and latterly was confined to bed by it. The excision of the excrescences was effected by means of curved scissors, readily but not very speedily, as they occupied a considerable breadth of surface all the way round.

The following cases, though they did not afford subject for operation, seem deserving of notice.

Psoas abscess.—Michael Calder, aged 14, came from Carnwath, near Lanark, last May, labouring under psoas abscess of both sides, and disease of the spine. On the right side the matter not only caused a swelling under Poupart's ligament, but could be felt distinctly fluctuating in a large cavity on the inner side of the ilium. The abscesses on both sides communicated freely, becoming more or less tense according to the position of the body. The lumbar part of the spine was painful when pressed or moved however slightly, and the patient exhibited that peculiarly stiff characteristic gait which is observed in persons labouring under disease of the spine, accompanied with or resulting from inflammation. He was thin and unhealthy-looking, and had been suffering from his complaint nearly a year. During the preceding autumn he had walked twenty miles for several successive days; soon after which the pain of his back commenced, and gradually increased. The swellings were observed in March.

The actual cautery was applied freely along both sides of the spinous processes at the pained part, and very soon after the discharge was established, he began to experience a remarkable change for the better. The spine was no longer painful when pressed; and he could not only move his limbs, but bend the trunk without any uneasiness. The tension of the swellings also was observed to be much diminished. In the middle of June I advised that he should be taken home to regain if possible his general health, and in case of doing so to be brought back, when the abscesses might be more safely evacuated.

He was re-admitted on the 2d of August, and had become so stout and healthy-looking that he could not be readily recognized for the same sickly emaciated creature we had previously seen. With the exception of the abscesses, which had suffered little alteration, he had now no complaint whatever. The right one was first evacuated by means of a trocar, and then the left one in the same way, but with the interval of three weeks; the wounds healed by the first intention. There still remained a slight degree of swelling on the right side; but as his health threatened to decline, he was again sent home, where he had not been long when one of the wounds opened and allowed the matter to drain off. He maintained his health, the running gradually diminished, finally ceased; and he is now in all respects perfectly well.

The result of this case, treated on the principle of not opening the abscess until the disease of the bone was subdued, contrasts very instructively with that of the following one.

William Brown, aged 23, was brought to the hospital on the evening of the 26th of August on a hand-barrow by two policemen, who stated that they had found him lying in the street. He was in the most wretched state that it is possible to imagine; being exhausted to a shadow, and so weak that he could hardly move a limb, while he suffered from a frequent diarrhœa, severe pain in his back, and a profuse discharge of thin matter from an opening in the loins. He stated, that six months before, after being exposed to cold, he had begun to suffer from pain of the back, and soon afterwards observed a swelling in the loins. About three months after this, he had come to town in search of relief, being at that time able to walk fourteen miles a-day with ease. Two days after his arrival the lumbar tumour was opened by incision, and he had never afterwards been able to leave his bed. How, under these circumstances, he came at length to be found in the state above described, it is unnecessary to relate. He was admitted into the Surgical Hospital, and had every thing done that was possible to soothe his sufferings. But he died on the 4th of October.

Sciatica.—James Gibson, aged 38, farm-servant, from Currie, recommended by Dr Craig, was admitted on the 7th of January on account of sciatica in the left thigh and leg, which had afflicted him more or less for two years, but latterly rendered him unfit for any sort of work. He complained of constant stiffness, and occasional severe pain. One needle was introduced into the hollow between the *trochanter major* and tuberosity of the ilium, about two inches deep, and allowed to remain an hour. He did not afterwards feel any pain below the knee, and found the stiffness greatly diminished. A few days afterwards the needle was again introduced, and allowed to remain two hours. After this he felt in all respects quite well, and returned home.

Another case occurred about the same time, which was similar in the symptoms, treatment, and result.

Dislocation of Spine.—Alexander Robertson, aged 37, fell, 8th August, on a heap of rubbish, and, lighting on his posteriors, suffered a violent impulse of the trunk forwards. When brought to the Hospital, and placed in bed, it was observed that the spine formed an acute projection at the junction of its dorsal and lumbar portions; and that at the summit of this projection there was a space nearly two fingers-breadth between the spinous processes. He complained of intolerable pain, which occasioned him to groan and scream almost without ceasing during the night after the accident. He could not expel his urine, and was unable to move his legs. He lay upon one side, and dreaded the slightest movement or pressure, which greatly aggravated his sufferings. On the 10th, his condition, which had been regarded as nearly hopeless, began to improve. He had a natural evacuation of his bowels, and began to move his left leg. On the 11th, he passed his urine without the assistance of the catheter. On the 13th, he moved both legs. On the 16th, he turned himself in bed. On the 26th, he sat up in bed. On the 17th September, he was dismissed, being then able to walk with a stick. He is now only somewhat feeble. The spine has become much straighter, but still retains its convex form and separation between the spinous processes.

Spontaneous Dislocation of Cervical Vertebræ.—Peter Macneil, aged 16, had his leg amputated about two years and a-half ago. Owing, as he alleged, to a window being left open in the room where he lay after the operation, he caught cold, and felt a painful stiffness of the neck, from which he was never afterwards free. He gradually became unable to move his head on the vertebræ connected with it, in any direction, or in the slightest degree. He was not, however, confined to bed, but suffered almost constant pain. I was asked to see him last July, and proposed to apply the actual cautery. The friends consented, and were anxious to bring him to the Hospital, but while they were contriving some method of conveyance, he suddenly died. For two or three weeks previously he had complained of difficulty in swallowing.

On dissection the atlas was found firmly anchylosed with the occiput. Both bones were considerably destroyed by absorption, in consequence of which the process of the *vertebra dentata* had been detached from its connections, and become dislocated backwards, so as almost to obliterate the spinal canal, there being left merely a transverse slit, certainly not more than a quarter of an inch wide. It is probable that this contraction of the passage and consequent pressure on the *medulla oblongata*, had been increased immediately before death. But it appears from the slight degree of mobility permitted by the thickening and induration attending the disease, that this increase must have been very inconsiderable; and the preparation, which is preserved, affords a curious specimen of the extent to which the nervous tissue may be compressed *gradually*, without losing its power of functional action.

Exostosis.—Joseph Snodden, aged 14, from Tranent, was admitted into the hospital on the 1st of November on account of a severe bruise of the hand, which he had sustained in ascending a coal-pit, owing to some accidental derangement of the machinery. He was a healthy-looking boy, of fair complexion, and rather slight figure. Almost every bone in his body was found to be the seat of exostosis. The excrescences formed in most instances large tumours obvious to sight, in others they could only be felt. The largest were on the tibias, thigh-bones and scapula. He did not complain of any pain or inconvenience on their account, and was not sensible of any recent change in their size or figure.

Obstructed Urethra.—In last report it is mentioned that William Swanston, aged 32, had been admitted into the Hospital on account of a complete obstruction of the urethra, which had resulted from a blow on the perineum, and existed 25 years. He is now quite well, and engaged in the country as formerly in the capacity of a farm overseer; but though his cure has been completed, I am persuaded that it would have been effected more speedily and easily on a different principle than the one which I pursued. Instead of making a free division of the obstructed part, and at once introducing a full sized catheter, I passed at first a very small instrument, and expected that the canal would dilate as in cases of stricture through means of a succession of larger ones. But it proved that an obstructed urethra could not be dilated on the same principle as a contracted one; and so little ground was gained by passing bougies, that I found it necessary to introduce a bistoury again, to divide the portion of septum that remained.

Defective Vagina.—Marjory Manson, aged 22, came to this city from Shetland on account of amenorrhœa, and various symptoms connected with it. She was treated for many weeks by a skilful physician with all the most approved emmenagogues, but in vain; and being at length dismissed as incurable, she was seen by one of my pupils, who thought of examining the state of the organs more immediately concerned. He found an orifice in the ordinary situation of that of the vagina, which with difficulty admitted a finger, and when it was withdrawn a gush of urine followed. In short, it was ascertained that this opening led into the bladder, and that there was no vagina. She was admitted into the Hospital in order that a search might be made for it; but though something like the uterus could be felt through the coats of the bladder, no trace of the missing passage could be discovered.

2, *Forres Street*, *6th March* 1832.

Art. XI.—*Account of the Epidemic Cholera of Newburn in January and February* 1832. By David Craigie, M.D.

Of all the places in which Malignant Cholera has yet appeared in this country, there is none in which its epidemic influence has been so distinctly and severely displayed as the village of

Newburn.* This place, which belongs to the manor of the same name in the possession of the Duke of Northumberland, is situate on the north bank of the River Tyne, about five miles and a half above Newcastle. The basin of that river consists of a valley lying between the Durham and Northumberland hills, in such a manner, that, while the former rise gently, and with the intervention of a space of flat meadow ground, the latter start up almost immediately from the banks of the river into rounded irregular elevations. While on the Durham or south side of the Tyne, therefore, there is a valley, flat and alluvial to a greater or less extent from the banks of the river, on the north side the ground rises rather suddenly into a series of rounded hills of moderate elevation, perhaps 200 or 250 feet above the level of the river, and forms an extensive table land, along which run the line of the Wall of Antoninus, and the present road to Corbridge, Hexham, and Carlisle. The whole of the face of the north bank, indeed, from about a mile above Newcastle, presents this abrupt degree of sudden elevation, and forms a remarkable contrast with the north bank of the river, which consists of a level vale, varying in breadth from half a mile to a mile.

The face of this north bank is occupied by three villages, all within the parish and manor of Newburn,—Scotswood, about three miles and a half above Newcastle, Lemmington, about one mile farther up, and about a mile still higher, the village of Newburn, from which the parish and manor are denominated. The houses of the village of Scotswood are situate partly on a line pretty high up from the brink of the river, partly in irregular groups farther down. Those of Lemmington, which are much less numerous, are placed nearer the Tyne; and indeed the acclivity of the ground at this point is less remarkable than at Scotswood below, and at Newburn above. The houses of Scotswood have internally a great appearance of cleanliness, neatness, and comfort; they have a southern exposure, and must be freely traversed by the east winds and the alternate currents up and down the river; but the elevation of the ground on the north side must, in my opinion, interfere with perfect ventilation; and I should think that the atmosphere is rather damp and humid. The hamlet of Lemmington partakes of the same general character, with two exceptions. The first is, that, as the ground behind it has a more gradual acclivity, the humid air of the river is more likely to be carried away easily. The second exception is one relating to the houses themselves. Many, if not most of them, are built on a descending bank, in such a manner that, though the southern exposure of the house is above ground from four to five feet at least, the northern or back exposure is below the surface of the earth. The doors of these houses, which are on their northern sides, are at the base of a flight of five or six steps, and the windows, which are not about three feet high, are completely on a level with the surface of the ground. A pathway about five feet broad runs along them; and on the north side of the path is a row of small hovels constructed of wood and clay or earth, and devoted chiefly to the breeding of pigs and some poultry. In this tract humidity abounds, and there is a good deal more filth than is compatible either with comfort or salubrity. From this character, however, I must except two or three houses towards the western extremity of the village, and in the vicinity of which, though standing on the same locality on the descending bank of the river, more attention is paid to cleanliness.

---

* Though this was written previous to the occurrence of the large mortality from cholera at Fisherrow, I do not regard it as requiring alteration. The material point remains unaffected, as, in so small a population, there has nowhere hitherto been so large a mortality. In many respects Newburn and Fisherrow are similar in local peculiarities; but the population of the latter is greatly more dense, and the interior of the houses is infinitely less clean and comfortable. In this respect, indeed, the two places cannot be mentioned together. During the epidemic of Musselburgh, I was in many houses in Fisherrow, in which there seemed to be no window and no chimney, and in which the smoke issued, and light and air were admitted, by one and the same aperture in the roof. The floors are all earthen, and wet and filthy to an extreme degree. Such a state of things would hardly be credited within ten miles of Edinburgh.

The village of Newburn consists chiefly of two rows of houses, built on two alluvial ridges parallel to each other, and to the bank of the Tyne. The southern of these ridges, which is nearest to the Tyne, is the least elevated; and it appears so low, that the ground between it and the Tyne appears to have been raised by artificial means for the construction of a railway. North of this ridge, and consequently of the houses built on it, is a hollow more depressed at the east than the west end of the village, where it ascends gradually to the ground on which is the village burying-ground and the parish church. From this hollow again, which lies between the two rows of houses, and corresponds to the street or public road of the village, the ground rises on the north into another ridge, which is occupied in like manner with a similar row of houses. Behind these, however, and indeed to the east and the west also, the ground rises into elevations so suddenly as to prevent the houses of the village from being seen, till the visitor approaches so near as to seem almost to drive over their roofs. These elevations, so far as they were exposed, seem to consist of sand and mould, resting on bituminous shale and alternate beds of clay. They give origin to a number of rills, which unite in a small brook which traverses the village of Newburn at its eastern extremity, and falls into the Tyne at the distance of about 80 or 90 yards from the southern row of houses. This circumstance, with the hollow between the two houses, gives a dirty and damp appearance to a village in other respects neat and even picturesque. The houses consist, with two or three exceptions, of a single flat, built on the ground; and the floors are earthen or hardened clay. The village inn, a house on the north side, near the bridge, and one or two others, are the only houses which have a flat above the ground one. The interior of these houses was clean, neat, and in general comfortable; most of them had good furniture; and there appeared to be little want either of the necessaries or the comforts of life. Without, however, there was less attention to cleanliness and dryness than could be wished; and in one place, at the east end of the village, near a sort of incomplete square, one house of which was distinguished by the name of *Newburn Hall*, there was an extensive dunghill, which was certainly too near the dwellings of the inhabitants.

Notwithstanding these inauspicious appearances, however, I must mention, that the inhabitants are said to be a healthy, vigorous race, and to have presented several extraordinary examples of longevity. Those whom we saw not labouring under the epidemic sickness appeared to be good specimens of the human race, both for size, figure, and strength. The inhabitants are either wherrymen, glass-workers, or connected with the coal trade; a few are agricultural; and one or two were devoted to handicrafts. The staple food of the village appears to be bacon, large flitches of which were suspended from the ceiling of every house in the village. The bread used is baked by the inhabitants themselves, and consists principally of flour baked with milk or butter. Indeed, I saw no bread not prepared in this way; an article, I believe, abundantly nutritious to those accustomed to it, but I should think rather liable to disturb the action of the stomach and bowels.

The population of the manor and parish of Newburn must be considerable, amounting perhaps to 1800 or 2000 persons at the least. The population of the village, however, in which the epidemic took place is exceedingly small. It contains only 131 houses, *thirteen* of which contain two families each, so that the entire number of families in the village is only 144. The number of the inhabitants, as obtained by an accurate survey conducted while we were there, is only 550.

Situate as now described, the village of Newburn remained in perfect health apparently till the end of December 1831; and about this time a young man of 21 years, named Thomas Robson, occupying a house situate in the inner row of the village, close by the Newburn rivulet, was attacked with symptoms of cholera, and cut off on the 4th day of January 1832. This man, it is important to remark, had survived the stage of collapse without aid apparently, and without stimuli. Reaction came on, and was attended with strongly-marked symptoms of affection of the head. At this time he was seen accidentally by Mr Fyfe; but he was then moribund, and died in the course of the day.

It was a general belief among several persons at Lemmington, with whom I had some conversation on the 15th of January, that the disease was imported from Newcastle; and the mode in which they accounted for this importation was the following. A man named John Wailes died in the Sandgate, at Newcastle, about the 13th of December 1831. The father of this man was a glass-worker at the hamlet of Lemmington; and, either before or immediately after his death, old Wailes, it was said, had gone to Newcastle, and spent a night in the house of the son. Whether there was any truth in this report or not, it is certain that Mrs Wailes, the widow, had a few days after proceeded to Lemmington to the house of her father-in-law. Here she remained well till the 21st of December, when she was attacked with symptoms of cholera, and died the following day. Wailes, the father, who was much addicted to intoxication, of very irregular habits, and, notwithstanding his occupation of glass-worker, often exposed to cold wet air, was attacked on the 28th December, and is said to have died after a lapse of ten hours. The same day a man named Hall, also a glass-worker, but a person of much steadiness and sobriety, was attacked and cut off; and a wherryman, who was very irregular and addicted to drinking, and had been sleeping in the fields, became the next victim of the disease on the 29th December. These persons were living in the immediate neighbourhood of the house of old Wailes. At this time, it must be further remarked, diarrhœa was prevailing among many of the wherrymen on the Tyne. Thus, at Bell's Close, a group of houses near Lemmington, several cases of choleric diarrhœa or serous diarrhœa, with choleric symptoms, took place in December, between the 19th and 26th of that month. But the first well marked case of genuine cholera appeared in this place on the 1st January 1832, the second on the 2d, in the same house and family; and one case appeared on each of the three successive days, till five persons were attacked, and three cut off by the disease. At Scotswood, again, the choleric diarrhœa first began to prevail on the 18th of December; and it appears then to have subsided till the 15th of January, when several cases occurred. In this hamlet one malignant case appeared afterwards on the 25th of January, and another on the 27th.

These facts are sufficient to throw great doubt on the supposition that cholera was conveyed to Newburn by the widow of John Wailes the younger, or by old Wailes. It cannot, indeed, be concealed, that the cases which afterwards occurred at Lemmington were all in the immediate vicinity of the house of old Wailes; but to this it must be replied, that the circumstance might as readily be regarded as a proof of the fact, that there was in that locality something peculiarly favourable to the developement of the disease in its most virulent and fatal form, as that it was communicated either *from* Newcastle, or thence *to* the neighbours, and thence *to* the inhabitants of the village of Newburn. It is at all events certain that diarrhœa had been prevailing to a greater or less extent among all the houses situate along the north bank of the Tyne from the middle to the end of December; and that the first genuine and fatal case which occurred at Newburn, in the person of Thomas Robson, took place on the 29th of December, at a period when it was impossible to suppose that it was transferred from the person of Wailes, and when it was well known that several of the associates of Robson were labouring under choleric or common diarrhœa. In short, it may be reasonably, and without any violence, inferred, that the cases in the neighbourhood of the house of Wailes, formed altogether a distinct group of the disease, and as my friend, Mr Fyfe, though rather inclined to the idea of personal communication, remarked in a letter of 2d February, were entirely unconnected with those at Newburn, Bell's Close, &c.

After the death of Robson, no new case of cholera occurred at Newburn till Tuesday the 10th January 1832, and the village continued in a state of health, which was at least externally apparent. I am obliged thus to modify the character of the constitution of the village, because in the course of subsequent inquiries on the 15th and 16th, it resulted that many persons had laboured under bowel complaint of different degrees of severity for *eight* days or even a fortnight previously. I then learnt, in a very partial and imperfect manner, a fact of which I have since had at Musselburgh tolerably satisfactory proof, that in many persons slight looseness comes on, and after lasting for a day or two subsides spontaneously, or after very ordinary domestic remedies, and, if not re-excited by some error in diet or exposure to cold or moisture, permanently. But after any irregularity, however slight, this looseness is liable to recur, and again subside, or under certain favourable circumstances to be converted into cholera, mild or virulent. I must also say in reference to this subject, that, however proper, symptomatically and therapeutically, the distinction of cases into *diarrhœa*, *common cholera*, and *malignant cholera* may appear, it is, when applied to the epidemic altogether inadmissible. I am satisfied, from the progress of this epidemic both on the continent and in England,

and Scotland, and from the facts which I have been able to collect either personally or from others, that these diseases differ in degree only, that all of them depend on common causes operating in different degrees, in different localities, and on different individuals. Thus, to appeal to the places on the continent, with which circumstances have rendered me most familiar, in Moscow according to Delaunay, and at St Petersburg according to Dr Gibbs, both previous to the epidemic, during its prevalence, and after its subsidence, disorders of the alimentary apparatus were common among all classes and ranks. Flatulence, indigestion, and diarrhœa were general complaints throughout both cities. When in Newcastle also in the month of January, I was informed by Mr Fyfe, that symptoms of gastric and gastro-enteric disorder were greatly more general than usual. We must, therefore, I conceive, admit a tendency to gastro-enteric disorder, which assumes in certain classes of persons different forms, until it attains the specific degree of virulence constituting genuine cholera.

To return from this digression, which was required by the precursory complaints of the inhabitants of the north bank of the Tyne,—the first cases of the epidemic visitation of cholera occurred in the family of the Trotters, living in a small house, situate rather low, on the Tyne side of the village, and on the west side of the Newburn rivulet, very near its margin. On Monday night, the 9th, Jane Trotter, aged 26, was attacked with purging, cramps and retching, and died on Wednesday the 11th. Thomas Trotter, aged 4, was also observed to be sickly on Monday, and died on Tuesday. Lastly, Jane Trotter, aged 60, the mother of James Trotter, the husband of Jane, was taken ill on Tuesday about one in the morning, and died about eleven on Wednesday.

The next case occurred in the person of James Sommerside, an old and somewhat broken down man of 60, who was attacked on the evening of Tuesday the 10th, with violent purging, vomiting and cramps, rapidly followed by coldness of the surface, and death, which took place on the morning of the 11th. The same night on which Jane Trotter and James Sommersides sickened, there were at least 13 persons attacked in the village, of whom 11 were in the Tyne side row of houses; and of these, besides the fatal cases already mentioned, there were other three in the persons of Edward Fowell, Mary Lambert, and Jane Veitch. One of the recoveries was James Trotter, aged 28, the husband of Jane Trotter, and the son of the old woman of the same name, who was taken ill on the Wednesday night, with weight in the epigastric region, and violent purging, succeeded by vomiting and cramps. By the use of paregoric, however, brandy and warmth, the symptoms proceeded no further, and on Sunday the 15th he was convalescent. His appearance was that of a stout vigorous man. Among the recoveries on the other side of the village, was one girl Elizabeth Shotten, aged 18, of small size, and rather delicate, but interesting appearance, who was attacked with purging and cramps in the arms, knees, and legs, and who made an excellent recovery under the thebaic pill. When I saw her on Monday the 16th, this girl was quite well, and had recovered her natural appearance. To the cases of William Humble, James Parkes, and Mary Gibson, I shall advert afterwards.

During the night between Thursday the 12th and Friday the 13th of January, four persons were attacked,—two females, Ann Bell, and Jane Bones, and two males, Roger Potter and John Watson, all of whom died in the course of Friday. On Saturday the 14th, six deaths took place, three of which were in one family, Mary Hodgson, Jane Hodgson, and James Hodgson; the latter, a delicate young man, labouring under lumbar abscess, sunk under the disease in the course of seven or eight hours. The other three victims were Elizabeth Humble, living in a house on the south side of the village pretty high up, and contiguous to the churchyard; Dorothy Hedley, occupying part of a large house standing by itself, on the east side of the Newburn rivulet, close by the small bridge; and Joseph Dance, aged 44, in a small house on the north side of the village.

Notwithstanding this mortality, however, several cases did not terminate so unfavourably. Thus Mrs Hall, the wife of Mr Hall, had been ill since Thursday night, but had gradually recovered considerably, and on the 15th, when we saw her, she was convalescent, though weak. John Watt, in like manner, a man of 42, had been attacked on Thursday night or Friday morning, but was also convalescent on Sunday. Richard Browell, aged 53, also was attacked on Friday with hard, fixed, pungent pain in the epigastrium, and looseness accompanied with full bounding pulse, for which he was blooded, and was better the following day. William Nixon, aged 24, was attacked on the 12th during the night with diarrhœa, for which he received some medicine from the village apothecary. On the 15th, when we first saw him, he was still uneasy in his bowels, and was ordered calomel and opium pills. On the 16th he was convalescent. His sister, Catherine Nixon, aged 22, had also been taken ill about the same time, and continued in a fluctuating state till Sunday, when, with some purging, the pulse was still good, and the skin warm. She was at the same time ordered some opiate pills; and next day, for some purging in the morning, calomel and opium.

On Sunday the 15th of January, in company with my friend *Dr Cobb* of London, Mr Little of London, and Mr Atkinson of Leeds, I visited this village, and met there with Mr John Fyfe, to whose kindness and attention our whole party, but especially myself, are deeply indebted for the facility with which we were at once made acquainted with all the cases. The number which we witnessed in different stages and forms of the disease was very great. I am certain I do not exaggerate when I assert that we entered at least 30 houses, and saw at least 40 cases. The whole of these it would be at once superfluous and tedious even to mention; and after stating that much of the information collected on this day I have embodied in the preceding sketch, I shall simply glance at a few of the cases, so as to communicate some notion of the progress of the epidemic and its ravages in the village.

The chief new cases on the 15th are given in the table in pages 346, 347.

There were thus at least 14 new cases, besides a great number of trifling ones, for which a dose of opium, or opium and calomel, were sufficient. This day was, however, remarkable for the 15th case, and the 5th death, which deserves particular note, being that of the vicar of the parish, the Reverend Mr Edmonston, which has been adduced by several persons as an instance of the influence of contagion. This idea I think it quite impossible to adopt, if we consider the circumstances of the case with any attention; but to obviate any thing like bias, I shall state the simple facts, as I know well they took place.

The Reverend Mr John Edmonston was a man somewhere between 76 and 80, of a full habit, and rather inclined to corpulence. He had, indeed, been somewhat among the sick; but this must have been of short duration, and was only during the last two or three days, that is, not sooner than Thursday the 12th of the month; and as he was extremely afraid of the disease, there was little reason to believe that he would expose himself unnecessarily. If I am not misinformed, indeed, he took every precaution in approaching the sick which a person impressed with the firm belief of the contagious nature of the disease could employ. His house, I must further remark, is situate at the west extremity of the Tyne side of the village, much nearer the river than any of the others, and stands, indeed, on a declining bank, with nothing but the terrace of the railway interposed between it and the water. Though extremely clean inside, snug and comfortable, I must say the situation is such as to obstruct in a remarkable degree the process of free perflation and ventilation. With the artificial terrace of the railway on the south, and the rising bank of the village and churchyard on the north, the situation of the vicarage of Newburn is such as to favour in a remarkable manner the sojourn of any damp vapours which might pass from the river or its banks

Name.	Age.	Residence.	Symptoms.
1. Mary Turpin,	35	A well aired house, up one stair in the imperfect square already mentioned, near the Tyne.	Last night, purging, great faintness, and cramps. To-day weak, pulse languid.
2. Mary Johnston,	67	Corner of same square, a well aired room up a stair, but near the Tyne.	Frothy diarrhœa, great weakness, faintness, and coldness; pulse distinct.
3. James Watt,	10	Same square, but near the Tyne and small brook.	Purging, cold skin, hollow temples, and eyes deep livid, areola round the orbits, weak small pulse.
4. Mary Callander,	27	Tyne side of the village, earthen floor.	Purging and cramps; pulse very weak.
5. Richard Browell,	18	Tyne side of the village, earthen floor below an upper flat.	Attacked with purging, weight and fulness of the epigastrium, nausea, pulse bounding and full.
6. Catharine Milburn,	34	Tyne side of village, about 150 yards east from the village inn; low damp situation.	Attacked last night at half-past 12 with purging of watery fluid; rice-coloured, with albuminous flakes, hands blue coloured, nails blue, skin corrugated, fingers incurvated.
7. Bell Trotter,	2	Tyne side, one of the back houses between the Tyne and Newburn rivulet.	Rice-water dejections; pulse languid; eyes sunk; temples hollow; extremities cold; head symptoms.
8. John Brain,	31	Tyne side of the village.	Purging and cramps.
9. Mrs J. Veitch,	25	Tyne side, near the west end of the village.	Vomiting, purging, chillness of surface, arterial pulse very weak, at wrist gone, listless, and difficult to be roused.
10. Ann Veitch,	1½	Same house.	Cold surface, hollow eyes and temples, orbits surrounded by bluish *areolæ*.
11. Rev. Mr Edmonston,		See text, p. 345.	
12. W. Humble,	20	North side of the village, and high piece of ground contiguous to church-yard.	Purging, a little collapse, almost over,—skin warm, pulse small, but distinct,—countenance, though thin and contracted, flushed in the cheeks, feels warm, without headach.
13. Edward Humble,	10	Same house.	Purging of rice-water fluid, which on examination gave a brown colour to turmeric paper; pulse gone at the wrist.
14. Sarah Brown,	9	In a second floor in a house on the north side, near the middle.	Surface cold, leaden coloured, listless, and stupid; pulse at wrist gone; watery purging.
15. Mark Scott,	66	In a back house of north row, up a few steps.	Pulse gone at wrist, lies listless, insensible, and incapable of giving answers.

Remarks.	Treatment.	Event.
, had been acting as several of those who	Calomel and opium after a mustard emetic.	Convalescent on the 16th with feculent stools.
oman, living in appa- fort, but in very low	Calomel and opium pill. Chicken soup with rice.	After languor and debility on the 16th, began to improve on 17th.
ohn Watt, affected on	Small doses of calomel and opium. Chicken soup.	Reaction on the 16th, with headach, convalescent on the 18th, recovered on 18th.
on Thursday 12th, bet- turday 14th, and ap- nvalescent on Sunday	*Enemata* of hot water and spirits. Calomel and opium. Chicken soup.	A little purging on the 16th, with trouble of the head, which increased on the 17th, died on the 18th.
chard Browell Senior. 4.	Blooded to xx. oz., castor oil, followed by calomel and opium.	Epigastric uneasiness gone on the 16th; stools feculent; convalescent on 17th.
an had been ill for a t is, since the 7th, with health and distension owels, and occasional	*Enemata* of hot water and alcohol; warmth by hot plates to the surface; warm water, brandy and water by the mouth; thebaic pill; chicken soup.	Improved on the 16th and 17th. But from various causes she relapsed; and died in imperfect reaction on 20th.
l, the daughter of Jane who died on the 11th: ing on the 10th, which went, till on the 15th ated in choleric stools.	Small doses of calomel and opium, warmth to the surface and extremities, leeches to the head.	Leeches not applied, but the child was better on the 16th, and eventually recovered.
	Calomel and opium pill; chicken soup.	Purging gone on the 16th, convalescent on 17th.
an was attacked on Fri- h, with purging, then , and cramps of the legs, re.	Enema of hot water and alcohol, hot plates to the surface, opiate pills, brandy and water, leeches to head on the 16th; a nurse.	Better on the 16th, when there were symptoms of reaction, became worse on the 17th, and died on 20th.
hter of Mrs Veitch, had ince Friday night (13.)	Calomel and opium in small doses.	Died on the 22d.
on Tuesday the 10th iting and purging, and eeding rapidly to col- en the symptoms took a le turn.	He had some peppermint mixture from the village apothecary. Warmth to surface, flannel shirt, hot plates, opiate pill, some brandy and water.	This young man, though much reduced, recovered well.
was attacked on Satur- t, liable to worms.	Calomel and opium, brandy and external warmth.	Rallied on the 16th, with pulse felt at wrist, countenance natural, recovered well.
on Saturday, ordered dicine by a surgeon, s not given.	Calomel and opium, brandy, warm injections, and if headach or restlessness came on, leeches to head.	On the 16th headach, with returning pulse and flushed face, 17th cerebro-meningeal congestion, and on 18th death.
n was ill since Friday	Warmth to the feet and epigastrium, a blister to the head.	Died about 2 hours after we left him.

to the adjoining surface. To this may be added, the circumstance, that the whole is surrounded by a high wall, which, on the one hand, ought to have excluded contagious principles or their conductors, while, on the other, it prevented the free circulation of atmospherical currents.

Mr Edmonston was a scientific and amateur horticulturist, and was particularly successful in rearing some of the more rare and delicate varieties of tree and wall fruit; part of which he was in the habit of presenting to friends, part of using at his own table. For three weeks previous he had abstained from the latter indulgence with the rigour of an ascetic, and the self-denial of a philosopher. On Saturday the 14th of January, however, his circumspection appears to have been thrown off its guard; for on that day he had dined on an inauspicious dish of pickled salmon,—an article which is sufficient of itself in some constitutions to induce an attack of cholera, and which, in the present case, aided by the epidemic constitution, was too successful in giving rise to a rapid and violent attack of the epidemic disease. Mr Edmonston appears to have felt no uneasiness for some hours after dinner. But he retired to his chamber at the usual time; and his domestics, who heard nothing of him till morning, found him then in a state of great debility and helplessness. He had been attacked with sickness soon after going to bed, and the whole night he had been purged repeatedly and violently. The reverend gentleman had some knowledge of medicine himself; and whether it was from distrust of its powers, or from a desperate idea of his own case, or from approaching insensibility, for he was of what is denominated an apoplectic habit, he neither asked for assistance, nor, when his servant proposed it, would he hear of it. He had also, it must be acknowledged, some unreasonable prejudice against our excellent friend Mr Fyfe, whose delicacy would not allow him to wound the old gentleman's feelings by his presence. After some deliberation, however, it was determined that some attempt should be made to arrest the progress of his disorder; and accordingly he was visited first by Dr Cobb, who prescribed the usual remedies, and then by Mr Fyfe and Dr Cobb together. At the first visit, about half-past two, his face was flushed, his sensibility impaired, and his pulse slow and labouring, and he seemed to be suffering under symptoms of cholera complicated with those of oppressed brain. He had occasional retching, and frequent rice-water dejections. An hour after, the symptoms of vascular excitement began to give way to those of colliquation. The face was bluish and leaden coloured; cold clammy perspiration poured from every part of the surface; he had frequent hiccup; the sero-albuminous dejections continued to run from him; and the spasms of the legs were repeated and violent. Mr

Fyfe and Dr Cobb remained with him to the last, using every possible means to avert the fatal termination; but the old man breathed his last a little before five o'clock, not more than twenty hours from the first symptoms of uneasiness, and about twenty-five or twenty-six hours after the repast which had manifestly operated as the exciting cause.

I have been thus particular in giving the details of this case, because it has been more than once appealed to as an example of communication of the disease from the sick to the sound. I feel no difficulty in stating my opinion, founded on the reasons already assigned, that it is sufficient to look to the plethoric habits of the individual, the imprudent error of diet, and the epidemic constitution hanging over the village, and from which it was impossible that the parsonage could be exempt, in order to account for the attack and its unhappy termination. Where the attack can be explained on manifest principles, it is entirely gratuitous to have recourse to such an occult cause as contagion. I venture to assert, without possibility of refutation, that the intercourse with the sick went in this case for nothing; and, had Mr Edmonston secluded himself within his garden wall, the pickled salmon would have produced precisely the same effect.

Besides Mark Scot, the man already mentioned, and the vicar of the parish, three other deaths took place on the 15th of January;—viz. Ann Thomson, wife of Robert Thomson, aged about 48, in a house on the north side; Helen Morehead, and Anthony Jobson.

The virulence and fatality of the disease had thus been displayed in a manner sufficiently conspicuous, in the fact of at least 46 persons having been attacked, and 23 having been cut off; besides at least 7 or 8 more in a state threatening sudden dissolution. These circumstances were sufficient to throw a most melancholy gloom over a community so very limited. The circumstance, however, which brought to a crisis the distress of the villagers, was the sudden death of the vicar,—an event which they appeared neither to apprehend nor to be prepared for. The consternation into which they were thrown aggravated all their sufferings, and evidently increased the number of attacks. Mr Fyfe found it impossible to leave the village till past nine that evening; and his assistant, Mr Atkinson, who remained during the night, was so incessantly occupied with urgent calls for assistance and relief, that he was not in bed the whole night.

On the 16th of January, when Mr Little and myself returned to the village in company with Mr Fyfe, between the cases seen by his assistant Mr Atkinson during the night, and those which were reported to have taken place in the morning, the number was the following.

Name.	Age.	Residence.	Symptoms.
16. A. Paterson,	75	Tyne side of village, back houses near the river.	Vomiting, purging, cramps; pulse still felt; fingers cold and incurvated; skin corrugated.
17. Mrs A. Hall,	44	Tyne side of village, back houses near the river.	Pulse gone at wrist, yet surface warm; vomited lately a large worm; vomiting, cramps.
18. B. Ingleby,	70	Tyne side, the back houses near the river.	Vomiting without purging; has been constipated.
19. Susan Potter,	50	Same house.	Has been ill, but is now convalescent.
20. M. A. Anderson,	11	Back row of Tyne side.	Vomiting and purging of watery liquor since 3 this morning; no spasms; pulse distinct, though extremely weak.
21. John Price,	38	Front row of Tyne side.	Costiveness followed by purging and cramps without vomiting.
22. Mrs Price,	35	Same house.	Frequent loose stools.
23. Jane Aylesborough,	60	Front row of Tyne side.	Very frequent and severe purging of thick opaque fluid; no pulse at wrist; skin cold and clammy.
24. James Parkes,	66	The large house close by the bridge over Newburn rivulet, a large roomy apartment up one flat.	Attacked last night at 12 with vomiting and purging of white serous fluid; extremities cold; surface moist and clammy; listless and insensible.
25. Mrs J. Potter,	33	The same house, in an apartment on the ground flat.	Watery stools, nausea and vomiting. Much thirst; pulse distinct, but quick; no cramps.
26. M. A. Parkes,	17	Same house.	Looseness, but is able to go about.
27. E. Potter,	5	Same house.	Purging, and lost appetite.
28. Roger Potter,	8 m.	Same house.	Purging of serous fluid.
29. Mrs Isabella Hunter.	21	House a little to the east of the square near a very filthy dunghill.	Taken ill this morning at 1 with violent pain within, followed by purging; headach; pulse distinct and full.
30. Mary Turpin,	8	House in the square with her mother.	Belly loose for 3 or 4 days; attacked this morning at 5 with vomiting of watery fluid; pulse distinct; skin warm.
31. Jonath. Foster,	65	Back houses by the Tyne side.	Attacked this morning at 3 with vomiting, purging, and cramps; countenance contracted and collapsed; eyes glazed; impaired laryngeal voice.
32. Willm. Watt,	7	East side of the square.	Attacked this morning at 5 with vomiting and purging.
33. H. Callender,	29	Tyne side.	Spasms and pricking of the legs.
34. Mrs A. Browell,	52	Front houses of the Tyne side.	Cramps in the arms.

Remarks.	Treatment.	Event.
The frailty of age rendered this case rapidly fatal.	Sedative liquor; to have a nurse.	Died in the course of the day.
This woman had been indisposed for a fortnight, with general languor and uneasiness, costive for some time, with fulness of the belly.	Calomel and opium in pills, 5 gr. to 1½, warmth, brandy and water.	Died in the course of the day.
This appeared to be mere disorder of the digestive organs.	Calomel and opium after castor-oil.	Recovered.
The same in a different form. Both might have terminated in fatal cholera, if not opposed by remedies.		Recovered.
	Injection of hot water and alcohol; heat by plates to epigastrium, &c.; brandy; leeches if headach come on. Calomel and opium.	Recovered on the 18th.
	Injection of hot water and spirits; brandy by mouth; hot plates to epigastrium, &c.	Died on the 19th.
This man had diarrhœa for a week at least, that is, from Monday 9th or Sunday 8th, and was convalescent.	Thebaic pill; whisky, pure, without water; hot plates to epigastrium, back, and feet.	Died in the afternoon.
This woman, who was the daughter of James Parkes, had been very much constipated for some time.	Calomel and opium.	Better next day, and recovered.
This girl, the sister of the former, had bilious diarrhœa for 8 days.	Calomel and opium.	Looseness abated, and convalescent on 18th.
Daughter of Mrs Potter.	Calomel and opium in very small doses.	
Son of Mrs Potter.	Very minute doses of calomel and opium.	
The daughter of Mrs Hall of Newburn Hall. No communication with the sick, not proceeded to collapse.	Mustard emetic followed by calomel and opium.	Recovered.
The daughter of the widow Mrs Turpin, who acted as nurse.	Emetic followed by calomel and opium.	Recovered.
This man, who had bad asthma from the age of 38, spoke in a whisper; and this I at first mistook for the *vox cholerica.* He was, indeed, a wretched object; but his voice had been long weak.	Mustard emetic; warm brandy and water; warm enemata with alcohol; hot plates; and calomel and opium.	This poor man died in the course of the day.
The younger son of John Watt.	Calomel and opium.	Recovered.
Which he states positively he has had for a fortnight, that is, since the 2d.	Calomel and opium.	Recovered.
Wife of Richard Browell sen. and mother of R. B. jun.; slight.	Calomel and opium in pills.	Recovered.

Name.	Age.	Residence.	Symptoms.
35. Mar. Liddell,	38	Back houses, Tyne side.	Purging of rice-watery liquor ; pulse gone at wrist ; artery felt, but not pulsating ; skin cold and moist ; countenance and surface leaden coloured ; fingers incurvated ; cramps ; nails blue.
36. Eliz. Liddell,	6	Same house.	Hollow eyes and temples ; cold surface ; incurvated hands ; pulse very faint ; and rice-water dejections ; she lies in a cataleptic state, with eyes fixed and staring.
37. W. Liddell.	33	Same house.	Weight at epigastrium ; going about.
38. Mary Trotter.	36	One of the front houses.	Attacked last night with purging ; is sick, but does not vomit.
39. W. Trotter.	35	Same house.	Attacked last night about ½ past 4 P. M. with purging of brownish fluid ; discharge whitish to-day ; is giddy.
40. Ann Stephenson,	60		Painful cramps of legs ; pulse good ; skin warm ; has trouble of the head.
41. Mary Newton.	22	Mrs Veitch's house.	Purging and vomiting of oat-meal water all night ; to-day headach ; pulse gone at wrist ; countenance pale and blanched ; voids urine however.
42. John Jobson.	42	House close by railway, west end of the village.	Gastrodynia and apprehension.
43. Mary Jobson.	44		Pains of legs.
44. Wm. Hindmarsh,	65	A house at the west row of the village.	Cramps and much looseness.
45. Margt. Hall,		Next house.	Nausea, vomiting, and general faintness.
46. M. Nicholson,	41	A house on the north side east from Humble's.	Weight of epigastrium and giddiness ; tongue clean ; skin soft ; pulse good, but weak and languid.
47. John Pattison,	5	A cluster of a few houses insulated near west side.	Frequent purging of clear watery fluid, with glairy flocculent matter in it ; griping ; thirst ; pulse weak.
48. Isab. Pattison,	7	Same house.	Vomiting and purging, discharge same as last one.
49. Margt. Shotten,	3	House of north side, next to Nicholson's.	Purging, relieved by calomel and opium given last night ; stools clay coloured.
50. John Shotten.	45	Same house.	Uneasiness about the stomach.
51. Mrs Shotten.	40	Same house.	Cramps.

Remarks.	Treatment.	Event.
Attacked this morning at 3 with profuse diarrhœa, followed by rice-water dejections; the countenance is leaden-coloured and shrivelled; and, though only 38, she looks above 50.	Enema of hot water and spirits; brandy by mouth in table-spoonfuls; an opium pill; hot plates to the epigastrium, back and legs.	Though this woman rallied a little after repeated injections of hot water and spirits, and the radial artery beat faintly after a few table-spoonfuls of brandy, she sunk in the course of the day.
The daughter of Margaret Liddell; attacked during the night.	Warmth to surface by plates; a little brandy; calomel and opium; 3 leeches to head.	Free from diarrhœa next day; pulse full and soft; and though the cheeks were flushed, the eyes were not suffused; vomited during night; recovered.
The husband of Mrs Liddell.	Calomel and opium.	Recovered.
The diarrhœa of this woman was yellow and still feculent.	Calomel and opium.	Recovered.
The husband of the foregoing.	Got a thebaic pill and some sedative liquor; calom. and op. to do.	Recovered.
Was attacked last night; the trouble of head was perhaps the result of the opium.	Got Liq. opii. sed. last night; to-day is ordered calomel and opium.	
The sister of Mrs Veitch. See the case detailed in text.	Calomel and opium pill.	Died the following day.
Both cases appear to have been either apprehension or pretension to procure brandy.	Gregory's mixture.	Recovered.
The incipient form of the disease.	Calomel and opium.	Recovered.
Was attacked on Friday with purging, which subsided spontaneously, and left her very weak.	Calomel and opium.	Recovered.
A serving-man out of place; his complaints were probably imaginary.	A calomel pill.	Slight case, recovered.
This boy was attacked this morning about 8, and was much weakened by the discharge.	Calomel and opium, followed by castor-oil.	Died on the 22d.
Sister of the former patient.	Calomel and opium; had castor-oil at 11.	Recovered.
This child, who was sister of Elizabeth Shotten attacked on Tuesday, was attacked last night after Mr Fife left the village,—that is after 9.		Recovered.
The father of last patient.	Both were ordered some calomel and opium.	Recovered.
The wife of last patient.		Recovered.

Name.	Age.	Residence.	Symptoms.
52. Elizabeth Rainshaw,	30		Face contracted and leaden-coloured; fingers beginning to be incurvated; purging to the amount of 5 stools to-day, but watery.
53. Rt. Rainshaw,	22m.		Purging without vomiting.
54. J. Rainshaw,	9m.		Severe purging.
55. Geo. Rutter,	16		Attacked yesterday with looseness, for which blood was drawn; better to-day; 1 stool of yellow matter, no complaint.
56. Josh. Rutter,	46		Purging of milky, watery fluid, without vomiting.
57. Jane Trotter,	63	North side of the village.	Vomiting and purging occasionally; pulse good; skin warm.
58. Mary Gibson,	29	Same neighbourhood.	Weak, languid, with occasional sickness, retching and purging.
56. M. A. Johnson,	17m.	North side of the village.	Looseness; purging of white watery fluid; eyes sunk and hollow; temples depressed; pulse weak.
57. Will. Tinling,	18m.	In the same house.	Purging of watery fluid.
58. Mrs Tinling,		In the same house.	A little indisposed.
59. Tho. Dance,	9	Next house.	Had looseness; pulse good; reaction.
60. Dav. Allan,	25	House on the Tyne side.	Mild case; convalescent.
61. Mary Allan,	23		Gastric uneasiness.
62. Mary Potter,	22		Cramps of the feet.
63. Will. Hall,	48	House in back row looking to the Tyne.	No sickness or purging, but uneasiness of stomach and epigastric region.
64. Will. Nicholson,	29	House in a lateral row going to the Tyne; snug and clean.	Purging of yellow frothy fluid; some weakness; face and pulse good.
65. Dorothy Nicholson,	30	Same house.	Purging of dark green fluid; some griping.

On the 16th, therefore, or between the night of the 15th and noon of the 16th, there were at least *fifty* new cases. These, indeed, were not all cases of exquisite cholera; for not above 12 or 13 could be at that time classed under this head, while the residue were chiefly examples of choleric *diarrhœa*, which, if neglected, might have assumed the choleric characters. I have nevertheless conceived it my duty to specify the whole in order, with their prominent symptoms, since all partook of the epi-

Remarks.	Treatment.	Event.
This woman was attacked on Saturday evening the 14th with purging, which was not very bad on Sunday, but recurred last night violently.	Calomel and opium; warmth externally; some brandy.	Died on the 20th.
Children of the last patient. The father was also complaining.	Calomel and opium in minute doses.	Recovered.
The matter discharged yesterday was white, and this forms a good example of the effect of blood-letting in altering the discharge.	Venesection yesterday; calomel and opium, 1 pill.	Recovered.
Father of the last.	Calomel and opium.	Recovered.
This woman had looseness for some time before. She had a languid appearance; but the symptoms were mild.	Calomel and opium.	Recovered.
Looked ill for a fortnight; vomited last week; was purged on Wednesday 11th, and on Saturday 14th discharged watery matter.	Calomel and opium.	Recovered.
This child had been worse, but was rallying.	Warmth; brandy and water in very small quantities, to be stopped when the face becomes flushed or the eyes suffused.	Recovered.
Mrs Tinling had lost her husband 11 days ago at Newcastle in Patison's yard. He was attacked at 3 on Thursday morning, and died at 8 on Friday evening.	Calomel and opium.	Recovered.
	Small quantities of brandy.	Recovered.
The son of Joseph Dance, who died yesterday, Sunday.		Recovered.
		Convalescent.
	Calomel and opium pill.	
Married and pregnant.	Castor-oil.	Recovered.
Some of his complaints were the result of alarm.	Calomel and opium.	Recovered.
Attacked this morning very early, but still going about.	Calomel and opium.	Recovered.
Wife of the last; seems stout.	Calomel and opium.	Died on the 17th.

demic character, and bore in a very distinct manner the choleric impression. The epidemic was indeed now at its height. The severe, virulent, and very rapid cases had taken place between the 10th and the 16th days; and while the cases were assuming a mitigated form, and observing a more protracted course, the diffusion of the epidemical principle was displayed not less conspicuously in its attacking much greater numbers of persons. The number of attacks had by this time amounted to at least 92, or *one-sixth* of the whole population; while 29 persons had already, in the course of seven days, fallen victims to the distemper.

The disease in the meantime continued to advance; but to describe its daily progress so minutely as I have hitherto done would be, I fear, tedious without being profitable; since it would only constitute a dry and uninteresting enumeration of the same revolution of symptoms, of onset, collapse, and death or reaction. A more useful service I think I may render, if I advert shortly to several circumstances in the history and nature of the disease, which in my opinion merit some attention.

The observations which I shall submit may be referred to the following heads; predisponent causes; formation and attack; stage of collapse; stage of reaction; mortality; treatment; pathology; and *lastly*, mode of origin and propagation.

On the subject of the characters of the disease, I have little room for novelty. That subject has occupied the pens of so many authors, that I almost despair of being capable of selecting any circumstance which has not been already dwelt on almost to tediousness. I went to Newcastle, however, with the determination to throw aside every thing I had learnt from the writings of others; to divest my mind of every preconceived notion; to doubt every thing regarding it; and to observe the disease personally with the impression that every fact required to be ascertained. I am quite aware that by this avowal I expose myself to the imputation of some degree of arrogance in supposing that all previous observers had been deficient in accuracy or assiduity, or had somehow failed to communicate a correct delineation of the malady. I have only to reply, that I went to study the disease personally; and as I confess my mind was a good deal confused by the discordant accounts of the success of very opposite modes of treatment, I was desirous to endeavour, on my own account, to disentangle some of the perplexity, and to form something like a distinct idea of the best and most efficient mode of treatment, in the event of the disease arriving, as it has since done, in our neighbourhood. Even on the great question, of the mode in which the disease originates and is propagated, I studied to go like one unbiassed either to the one side or the other, and resolved to admit no inference, unless supported by unambiguous facts.

In the *first* place, then, with regard to habit and predisposition, it is not the fact that the disease attacks only the feeble, the broken down, and the dissipated, or even those in indigent circumstances. In the village of Newburn, I saw many stout young persons of both sexes attacked by the disease, and not a few carried off. Though a few, as James Hodgson and Jonathan Foster, were persons enfeebled by the ravages of previous disease, yet the majority, as may be seen by glancing at the ages, were persons in the vigour of adolescence or middle age. The preponderance of attacks among females between 18 and 40, all in appearance of sound vigorous constitution, and, so far as could be learned, of sober regular habits, is also a conspicuous proof of the same principle; and the case of Mary Newton, which shall be mentioned under another head, is one of the many contradictions which are met to the statement, that the dissipated and irregular only are liable to attacks of cholera. As to the influence of indigence, I can only repeat, that the inhabitants of the village of Newburn appeared to all of us to possess in abundance all the necessaries, and several of the comforts, of life. They were well clothed, well fed, and well lodged; if we except the single circumstance, that most, if not all, the houses on the ground had earthen floors, which perhaps are better conductors, and more tenacious retainers, of moisture and vapour than wooden or brick floors. One circumstance relative to this head deserves particular mention. All of them had large fires in immense well ventilating chimneys; and I scarcely noticed a house which we entered without a good metallic oven.

By far the most powerful, both as predisposing and exciting, causes, I am convinced, are to be found in the diet of the persons attacked. It is totally unreasonable to object, that the inhabitants of Sunderland, Newcastle, Gateshead, Newburn, and other places, used the same food and drink in 1831 which they had used for years before, without any bad effects. We know that, on ordinary occasions, we use with impunity many articles of food and drink which, at particular seasons, and in certain states of the human frame, may become highly injurious. It must always be kept in mind, that the food which is harmless, or even refreshing on ordinary occasions, may become extremely injurious when the atmosphere acquires those little known qualities which give it its epidemic constitution. The cucumbers, water-melons, and iced-liquors, which the Russians of all ranks had taken liberally with impunity during the whole course of their lives, could not be used in many places during 1830 and 1831, without the probable risk of an attack of cholera. Even caviar and sterlet soup became doubtful articles of food during the epidemic constitutions of Moscow and St Petersburg. It is idle to suppose that the vicar of Newburn had never before eaten pickled salmon without injury; but we must infer that the same food which in all probability he had repeatedly taken with impunity, was followed at this particular crisis with the most pernicious consequences. The inhabitants of Newburn, I have stated, are very partial to bread baked with butter or some similar oleaginous or adipose ingredient, and live a good deal on bacon; and though it cannot be denied that on these substances they have been in the habit of feeding from infancy without injury; yet, I think, no one who knows the occasional effects of these articles of food on the digestive organs to those not habituated to them, would deny that at particular periods they might, with an insalubrious state of the atmosphere, be productive of remarkable disorder of the alimentary function and its organs. At such seasons I have known the pastry of a tart, or the Scottish cake known by the name of short-bread, followed by profuse diarrhœa; and it is fair to infer, that articles, the use of which may derange the functions of the alimentary canal at certain periods, may, during the prevalence of a particular epidemic constitution, induce an attack of specific disease. It was, at all events, a certain fact, that after the 16th, when a soup-kitchen was established, to provide the inhabitants with soup prepared from lean beef with rice, the attacks abated in number and violence.

Of the predisposing effects of previous diseases and discharges, we had a good instance in the case of the young man James Hodgson. When the disease appeared in the village and family, this youth was labouring under lumbar abscess, and was, by the violence of the disease, as well as by occasional colliquative diarrhœa, greatly enfeebled and emaciated. He was forthwith attacked, and sunk under it in about 7 hours. Of the effect of hemorrhage, I had a striking example at Newcastle, which, though rather out of place in reference to locality, may be properly mentioned here in regard to predisponent influence. A woman, the wife of a labourer, living up a flight of narrow stairs in a low damp lane called the Close, aged 28, was attacked about Tuesday the 10th or Wednesday the 11th, she could not tell which, with *menorrhagia*, to which it would appear she had been rather subject. This was moderated partly by remedies, partly spontaneously, but recurred slightly on Thursday and Friday. She was still, however, free from any other complaint, and was quite well on Friday evening at 9, when she prepared her husband's supper. Early in the morning of Friday, she was attacked by sickness, vomiting, and profuse purging, which augmented during the day. On the evening of Saturday, the 14th January, when I saw her in company with Mr Davison of Dean Street, the state of collapse was completely established. The pulse was gone at the wrist and brachial artery; the countenance and surface was of a dirty leaden colour; the features shrunk, so that I guessed her to be 50 years of age; the hands and fingers incurvated; the eyes sunk, the temples hollow, and the whole surface, except the abdomen, cold, and pouring out a chill unctuous moisture. She had occasional retching and hiccup; and though all the usual remedies were put in requisition, she expired at 2 on Sunday morning.

In a very large proportion of cases the disease began with a sense of weight and fulness in the epigastric region, suddenly followed by profuse diarrhœa. The rapidity with which this symptom proceeded to the true choleric discharges varied in different cases, and appeared to depend on the constitutional powers of the individual, on the situation in which he was living, and on the prompitude with which the diarrhœa was mitigated and controlled by appropriate remedies. Thus in the case of the Reverend Mr Edmonston, in whom the diarrhœal stage was extremely short, the individual was aged, plethoric, and neglected all remedies of every kind, so that till 2 o'clock, P. M. on the 15th, it may be regarded as an example of the uncontrolled and unmodified progress of the disease. In the case of Mary Newton, on the contrary, who was young, vigorous, and of unbroken constitution, but labouring under deep and overpowering mental distress, on account of the hopeless state of her sister, and the numerous instances of mortal sickness around her, the diarrhœal stage lasted from Sunday afternoon about 3, till the following day about 2, very nearly 24 hours. In the case of Mary Gibson, again, in whom the disease never assumed the genuine choleric symptoms, after anomalous illness of a week's duration, purging took place on Wednesday 11th, the second day of the epidemic, then some vomiting, after which she recovered under the use of some medicine; then on Saturday the 14th, she had discharges of watery fluid from the bowels; and on Monday, when we saw her, she complained chiefly of weakness and faintness, but was then convalescent.

In other cases, however, the symptoms observed a different course, and after preserving the diarrhœal form for several days, subsided so much as to lead to the belief that the patient was convalescent, suddenly assumed the choleric character, with profuse and repeated rice-water discharges, sinking of the pulse, and coldness of the surface, and terminated fatally in the course of 20 or 24 hours. This course was particularly exemplified among others by the case of James Parkes, living in the upper flat of the large house close by the Newburn rivulet. This man, who was 66 years of age, rather corpulent, but said to be of sober habits, had been ill with diarrhœa for about a week. It was impossible to determine the exact time at which his bowels began to be loose; but, according to the statements of his daughters, it must have been some time about Sunday the 8th, or Monday the 9th January. This diarrhœa, however, was never very violent, and under the use of some common remedies administered by the village apothecary, it had subsided; and he was regarded as convalescent on Saturday the 14th. He was indeed so well that I believe Mr Fife was not requested to see him on the early part of Sunday the 15th. About 12 o'clock, however, on that evening, he was suddenly attacked with vomiting and purging of white sero-albuminous fluid, which continued the greater part of Monday morning. He was soon seen by Mr Atkinson, the assistant of Mr Fife, who, as I have already stated, spent the night in the village; but notwithstanding the prompt use of the usual remedies, especially repeated injections of warm water and spirits, he was at eleven on Monday in a complete state of collapse. The pulse was gone at the wrist, the extremities and surface in general were cold, the skin clammy and moist, the features shrunk and leaden-coloured, the fingers immovably incurvated, and he was lying supine and in a state of listlessness and insensibility, indicating the rapid approach of death. Heat was directed to be assiduously applied to the epigastrium, back, and extremities, whisky to be given internally, and the *enemata* to be repeated. But the only marks of consciousness which the patient showed were to thrust out his hands and feet from the bed-clothes; and he expired in the course of a few hours.

The case of Mrs Hall of Newburn Hall, which I have already mentioned, was in some respects similar to this; but in its termination shows the injurious consequences of any attempt at unusual or excessive efforts. On Sunday and Monday this woman, I have already stated, was decidedly convalescent. From some unknown cause, however, she had a relapse on Tuesday the 17th, accompanied with profuse watery discharges from the stomach and bowels, the latter tinged dark green, and without cramps. The surface shrunk and became cold; the pulse failed in the extreme arteries; and when suddenly rising from bed, contrary to the express injunctions of Mr Fife, she fainted into a swoon, from which she never recovered.

The transition from the diarrhœal stage to that of collapse, though rapid, is never made *per saltum* as it were, but in all cases, in however short a time, by gradual and successive changes. In most of the cases in which I had an opportunity of remarking this transition, the countenance became first slightly blanched, and the skin began to assume a colliquative humidity. When the pulse was felt at this period, it was not gone, but greatly weakened in force and small in its size. The patient at the same time complained of a sense of sinking at the heart, with an uncomfortable sense of thrilling heat and unsteadiness, as if unable to support himself; and though there were instances in which the patient fell down at this period from weakness, yet afterwards, when the stage of collapse was thoroughly established, this extreme enfeeblement of the voluntary muscles was not recognized.

When the stage of collapse is fully established, the countenance is not so much of a blue colour as of a dirty, or dingy leaden tint. The only part which makes any approach to blueness is the *prolabia*, or red skin of the lips, which in several cases I certainly allow did assume the tint of the bilberry,—and the nails, which are livid, or of a purple blue. At the same time, the skin of the arms and hands, and legs and feet became corrugated, or puckered into wrinkles; and the hands and fingers became rigidly and immovably incurvated, as if the flexor muscles were affected by tetanic spasms. This symptom I regard as by far the most characteristic of the stage of collapse; for I remember none in which it was wanting; and I saw several in which the others were not marked till immediately before death.

In general, in the stage of collapse, the vomiting ceases; but the patient is from time to time distressed by an ineffectual retching, which, I think, has been often mistaken for vomiting. This action, however, I observed repeatedly, and I am certain that it bears no resemblance to that of vomiting. I am persuaded, indeed, that, if genuine vomiting could be effected, it would stop this unnatural squirting of the stomach, which adds much to the distress of the patient. To me, indeed, the appearance of patients in this state, communicated the idea of all natural communication between the stomach and intestinal canal being interrupted, exactly as if a tight ligature had been tied round the *duodenum*. As to the sense of constriction, of which patients complain in this stage, it is difficult to refer it to a definite point. In some, it is behind the sternum; in others, it is referred to the epigastrium, and perhaps is seated in the stomach; and in others, I think it is referred to the duodenum. When it consists of burning heat, it was generally referred to the stomach; and the craving for drink, where consciousness remained, was insatiable.

In many, perhaps all instances, the discharges from the bowels continued to run off to the last. In the case of the clergyman they were discharged immediately before death. In several patients they appeared to run off inconsciously. In their most perfect form, these discharges consisted of a thin whey-coloured fluid, with a more consistent and ropy liquor floating in it, quite similar to white of egg suspended in water. The smell was faint, somewhat similar to that of fresh white of egg; but in several instances I thought it approached that of the recently cut human brain, and in others it had a slight fishy smell. We tried its effect on the vegetable colours; but in one case only, that of the boy Edward Humble, did it produce any change, giving turmeric paper a brown colour, and thereby indicating its alkalescent quality. These discharges, I may add, Dr Cobb forwarded *per* mail to our common friend, Dr Edward Turner, Professor of Chemistry in the London University, who found they contained much albumen, and the salts of the serum. A more full report, I believe, will be afterwards given.

The function most affected, and on the affection of which that of all the other functions seems to depend, is that of circulation. Yet this affection does not consist in enfeeblement of the action of the heart, as has been imagined and asserted. In every case in which we examined the action of the heart during collapse, we found it invariably violent, strong, jarring, and tumultuous. I do not mean by this to assert that its action is *effective*. I have elsewhere attempted to show that the action of the heart may be augmented in force, yet inadequate to expel the blood thoroughly from its cavities. In the choleric collapse its action is certainly augmented in force, as if to overcome an obstacle; and if it succeeds in this, the disease is cured; but in the majority of instances it is inadequate to the duty. With all this force, however, which seems to be not so much an effort to impel the blood into the remote arteries, as one to relieve itself of the load of thick blood void of fluidity and therefore mobility—it is incapable of producing the effect. If we distinguish the blood-vessels into four classes, as they are situate in the trunk, at the union of the extremities with the trunk, on the nearest part of the extremities, and on the remote part of the extremities, it may be asserted that in the collapse of cholera, the cardiac pulse is seldom propagated to the third class of vessels, and never to the fourth. In the carotids and the axillaries it is generally feebly felt; but in the subclavian it partakes of the tumultuous action of the heart. In the iliac it is generally felt with a heavy labouring beat. I have in several cases felt distinctly the radial artery along its course; but without recognizing pulsation.

Respiration was rarely affected, unless through the lesion of circulation. The respiratory murmur was distinct, but feeble, during the collapse. The motions of respiration were rather slower and more languid than in health; and towards the termination of life, they became in general slow, feeble, and interrupted.

Suppression of the urinary secretion, though frequent, is not an invariable symptom. There is no doubt that it is extremely scanty, and perhaps before death it may be altogether suppressed. But both at Newburn and Newcastle we met with instances in which the urine continued to be secreted during part at least of the stage of collapse. In the case of Margaret Jameson, a woman of 44, which was particularly well-marked, and terminated fatally, both the patient and her sister asserted, that she continued to void urine 12 hours at least after the commencement of the state of collapse, 2 days before death, while the surface was leaden-coloured, sodden, and cold, cramps were violent, and retching and purging were frequent and profuse.

The affection of the animal functions is confined chiefly to the muscles of voluntary motion; and in these it is mostly restricted to the flexors. I have already remarked the rigid incurvation of the hands and fingers; and I believe there is nothing analogous to this hitherto noticed, unless in the tonic incurvation of the fingers and toes, which I have several times witnessed in infants labouring under a peculiar disorder of the alimentary canal, the same as that formerly noticed by the late Dr Kellie in this Journal as an affection of the thumbs, and lately described by Dr Marsh under the head of *Spasm of the Glottis*, in the fifth volume of the Dublin Hospital Reports. Of the physiological explanation of this I wish not at present to offer any conjecture, but merely confine myself to the generalization of the facts which I have observed. The cramps were observed chiefly in the *gastrocnemius* and *soleus* of the leg, in the *biceps flexor* of the thigh, and in the *recti* of the abdomen. In one or two instances I thought I felt the adductors of the thigh affected; and I think, had I examined a greater number of cases, I should have found this more frequently. But it is remarkable that none of the extensors of the thigh were ever seen cramped; and if those of the foot were affected, they also escaped notice. In the arms I never found the muscles affected with distinct cramps, but only thrown into spasmodic twitches. It is deserving of remark on this point, that in several instances the first indications of choleric attacks were twitching of the fingers and toes; and some persons who resisted all the other phenomena of the disease were assailed by this. A man who acted as gardener and man-servant to the Reverend Mr Edmonston, and whose name has not been put down in my notes, complained on Sunday the 15th, of twitches of the fingers and hands, for which some gentle laxative remedy was in the meantime ordered. The following day, about two o'clock, these twitchings had rather increased, but not to such an extent as to require very active measures. At four o'clock, as we were quitting the village, he ran up to Mr Fife's carriage to say that he had been since two attacked with several loose stools, and to request assistance, which was immediately ordered for him.

Yet with all this disorder of the voluntary muscles, and with the apparent *anaemia* of these organs, it is singular that the patients possess sufficient bodily strength to raise themselves to vomit, to go to the night-chair, to take medicine, and perform other duties which patients in fever could never undertake. Several I saw rise within two or three hours of death and perform these several duties with the greatest facility. This fact shows that the hypothesis, which insists on the necessity of continued supplies of fresh and newly respired blood for enabling the muscles to contract and for repairing their energy, is rather doubtful. These muscles must have been in a state of partial, if not complete, *asphyxia* as to their circulating system; and yet they betrayed no adequate marks of impaired energy.

I have only to add on this point, that the peculiar faint sibilous voice so characteristic of the intense degrees of this disorder, *(vox cholerica,)* seems to depend chiefly on anaemial spasm or cramp of the arytenoid muscles. This conjecture, however, I confess, I had no means of verifying in a satisfactory manner.

Sensation and consciousness remained in most cases unimpaired till the very last. To this rule, however, there were exceptions. James Parkes, for example, lay in a state of listlessness and apparent inconsciousness of what was going on for several, at least four, hours before death. Mr Edmonstone, in like manner, seemed indifferent to every thing for the last hour and a-half. In these instances there is no exact rule whether death shall be accompanied by spasms, or be the insensible and gradual transition from a state of quietude and immobility.

Though, as in most other places, the majority of cases died in the stage of collapse at Newburn, several nevertheless were cut off in that of reaction or *anastasis*. This stage, though represented to be so similar to typhous fever, bears nevertheless almost no resemblance to it unless in the oppressive affection of the head; and in this perhaps there may be some similarity in the state of the cerebral vessels in both conditions of the system. In fever, however, there is not only violent reaction of the heart and arteries, and hurried labouring respiration, but a torpid state of the alimentary canal, and much disorder of the nervous and muscular systems, in the form of delirium, convulsions, *subsultus tendinum*, and occasionally tetanic affections. In the anastatic stage of cholera, on the contrary, the heat is never above natural; and though the action of the heart is strong, that of the arteries is feeble. The nervous and muscular systems also are free from affection, save what results from the state of the cerebral blood-vessels, which invariably present symptoms of more or less considerable congestion. In short, the choleric reaction or *anastasis* is chiefly manifested in the congestion and oppression of the blood-vessels of the brain, and bears in adults a close resemblance to the phenomena of lethargy or coma. In some cases stupor and even apoplexy have been the precursors of the fatal termination.

One of the best cases illustrating this state of the stage of reaction was that of Mrs Veitch, aged 24, already mentioned in p. 346. On Monday the 16th, in consequence of the injections of warm water and alcohol, and the warmth applied to the surface, the skin had recovered part of its natural heat, and the radial artery was felt beating faintly but distinctly. The head, however, was beginning to be oppressed, exactly in proportion as the vascular system began to recover itself. Leeches were therefore ordered, and she was improving till the 17th, when the symptoms of oppressed brain augmented. Mr Fife promptly and energetically put in employment local bleeding, blistering, and scruple doses of calomel, always with temporary advantage. The effects of this treatment, however, were singularly counteracted by the constant tendency which the patient herself betrayed to lie with her head in a very depressed, if not a dependent position; and such were the general distress and misery in the village at this time, that the attendants even were inadequate to enforce the observance of the directions of the medical adviser. The result was, that whatever means were ordered really received no fair trial; and the poor woman expired comatose on the 20th.

It has been thought by some that the anastatic fever with which the European malignant cholera has been attended, either arose from, or was in proportion to, the *stimuli* administered during the stage of collapse. To refute this idea, it is sufficient to remark, that it takes place in cases in which no *stimuli* had been administered. Thus, in the very first case at Newburn, that of Thomas Robson, though no *stimuli* were given, he survived the stage of collapse, and had very strongly marked affection of the head, under which he sunk. Mr Fife, also, to whose experience I am much indebted, not only showed me proof of the justness of this opinion at Newcastle, but has since informed me by letter, that subsequent experience has convinced him that he may even go farther in many instances, and declare, " that the symptoms of reaction will be found in an inverse ratio, because it is the *duration* of collapse which gives violence to the reaction, and increases congestion when reaction ensues." This ingenious view certainly accords with every thing which I witnessed at Newburn and at Newcastle, where the stage of reaction was violent always as that of collapse was long continued; and hence in cases in which collapse is protracted, though the patient rallies, he has every chance of sinking under the violence of the anastatic symptoms.

It is in children, however, in whom these anastatic symptoms most remarkably affect the head. In these cases, which were numerous at Newburn, the symptoms of collapse assumed a most peculiar character, especially in infants. The characteristic effects of the disease were so strongly marked in the round plump features of children, that no one, perhaps, who had even once seen the singular constriction of all the parts, could ever forget it. The excavation of the temples and the eyes, which indeed were sunk in the orbits almost as if the surrounding adipose cushion of the ball had been by some unknown cause picked out or withdrawn, formed a striking contrast with the large convex forehead and the broad cheeks but small chin of infants. The eyeballs were at the same time surrounded by a livid *areola*, which, with the stupid, fixed, and inanimate, yet staring eye, gave a singular expression to the countenance. Some of them seemed to lie during this stage in a state more resembling catalepsy than any other condition; and while actually gazing at you, seemed quite inconscious of your presence.

From this cataleptic state they appeared to recover sooner than adults; and the first mark of rallying was slight injection of the conjunctiva, with marks of general restlessness and tossing of the head. In a short time transitory flushes of the cheeks, with warmth of the hands and feet, and increase of restlessness, indicated the establishment of this anastatic action, and the time for controlling it by applying leeches and cold to the head. Intolerance of light and sound, violent tossing of the head, piercing screams, jactitation, and, in short, most of the symptoms of cerebro-meningeal, or hydrocephalic inflammation came on, and, unless these were rapidly controlled, cut off the patient. In one case which Mr Fife showed me on the 16th, at Bell's Close, I think, but the notes of which I have mislaid, blood required to be drawn by leeches from the head for the control of these cerebro-meningeal symptoms I think at least 12 times,—always with decided benefit. When I saw this child, he was emaciated, with sharp extenuated features, reddish cheeks and peaked nose, but in other respects going about and doing well. The leeches were ordered to be repeated the moment he manifested signs of uneasiness about the head. Several children died, nevertheless, from the obstinacy of this anastatic cerebro-meningeal inflammation. Thus the girl Sarah Brown, aged 9, had come out of the cataleptic condition on the morning of the 16th, and cerebro-meningeal congestion was evidently fast approaching. Leeches to the head were ordered, and repeatedly applied, always with benefit during the 16th and 17th. During the night, however, she had been restless, and cried occasionally. On the 18th, when the eyes were red and the cornea clear, the pulse was about 100; the breathing natural, with clear respiratory murmur, and the skin of good warmth; but she lay supine and insensible, and passed no urine, and died in the course of the day.

In the articles of dissection we were unfortunate, so that I can say nothing from personal observation on the morbid anatomy of the disease. Two subjects, however, were inspected at Newcastle, both cut off during the period of collapse; and of these I may at some future period give an account.

The operation of the Newburn epidemic was, perhaps, the most extensive that has yet occurred in a population so small. The population of the village amounts, as I have already stated, to 550 persons, and of these 320 were attacked between the end of December, when the case of Thomas Robson occurred, and the 2d of February, when the disease had almost completely subsided.

Of these 320 cases, however, not the whole were exquisite cholera, but about 200 rather choleric diarrhœa and common cholera, which, however, if not checked, might have proceeded to the virulent disease.

Of these 320, 55 persons fell victims to the disease in the following order nearly: On the 4th January, 1; on the 11th, 4; on the 12th, 3; on the 13th, 4; on the 14th, 6; on the 15th, 5; on the 16th, 6; on the 17th, 3; on the 18th, 5; on the 19th, 3; on the 20th, 3; on the 21st, 2; on the 22d, 3; on the 23d, 2; on the 24th, 2; on the 25th, 1; on the 26th, 2; on the 27th, 1; on the 28th and 29th, 1.

Of these deaths there were *three* between 1 and 3 years; *two* between 3 and 5 years; *one* at 9; and *one* at 13; *eleven* between 20 and 30 years of age; *seven* between 30 and 40 years of age; *five* between 40 and 50 years of age; *five* between 50 and 59 years of age; *nine* between 59 and 69 years; *two* at 70; *five* between 70 and 80; and *one* at 82. The ages of the other three I have been unable to ascertain.

The proportion of attacks, therefore, was *three-fifths* of the whole population; and the proportion of deaths *one-sixth* of the whole attacks, and exactly *one-tenth* of the whole population.

On the subject of treatment I must be very brief; and I must premise, that I state merely the practice which I saw followed by Mr Fife, or what I have learnt from other professional gentlemen in Newcastle. I went with the view of acquiring a knowledge of the disease, and observing the effects of remedial agents; and while there, I regarded myself as entirely the pupil of those gentlemen who had the charge of the cases which I saw.

The treatment pursued at Newcastle and Newburn may be regarded as varying according to the character of the cases, and the stage of the disease.

In the cases of common or choleric diarrhœa, the first object was to check the profuse discharges; and this was effected either by calomel and opium, in the proportion of 5 grains of the former to 1 or 1½ of the latter, repeated according to circumstances, or by blood-letting, if there was a sense of fulness of the epigastric or umbilical region, with full bounding pulse, and flushed countenance. Some employed chalk mixture; but to this remedy Mr Fife has some objection. In some instances the sedative liquor or the thebaic pill was alone employed successfully against the diarrhœa; but in general the opium was either combined with or followed by a dose or two of calomel. Under this system the stools abated in frequency and serosity, and the discharges became natural in consistence and colour. In some instances castor-oil was used with advantage in this species of diarrhœa. In this stage and form of the disease, as in all the others, particular attention to diet was enjoined; and the patients were recommended to confine themselves to small quantities of chicken-soup or beef-tea, thickened with flour or rice.

In genuine cholera, however, a different mode of treatment was observed. Blood-letting was then rarely admissible, and indeed had after ample trial been disapproved of by most of the practitioners in Newcastle. The first object was when there was squeamishness, or sickness, or actual retching, to allay the irritability of the stomach; and this was most generally attempted by producing full and complete vomiting by means of the emetic of mustard and warm water. In some instances common salt was used with the same intention; but the mustard was generally preferred, because, as was stated by my friend Dr James Gibson of this place, it was found by Dr Smith, an experienced practitioner in Newcastle, to be highly successful in restoring the system after *asphyxia* by the choke damp, yet without the depressing effects of other emetic substances. After the production of full vomiting, it was usual to exhibit opium either alone or with calomel, and to give small quantities of brandy, in order to allay irritability and suspend the preternatural action of the intestinal tube. These measures were confined chiefly to the incipient stage of the disease, which, however, was in general followed so rapidly by the stage of collapse, that little time was allowed for their employment.

When collapse was either threatening, or had fairly commenced, the great object was to prevent the dissipation of heat or to restore it, if the surface and extremities were cold and clammy. The means employed for this purpose were, in the *first* place, the speedy and repeated application of heated plates, hot bottles, or heated bricks, or bags of heated sand, to the epigastric region, between the legs, at the back, to the legs and feet, and the wrists and hands. Of all these means of applying heat, those by heated plates appeared to be most generally resorted to, and most successful. The second mode of restoring heat, or preventing its dissipation, was the injection of hot water to the amount of two or three pints, with four, five, or six ounces of spirits into the intestines,—repeated according to its effects, and the state and constitution of the patient. This method, so far as I saw, was highly successful; and I think that the recovery of several patients from very hopeless states of collapse, was chiefly owing to the assiduous and seasonable administration of that measure, combined, as it was, with that of the hot plates to the surface. Mr Fife expressed repeatedly to me great, and I think well-founded, confidence in this mode of applying heat and stimulating the vessels. With the injection of hot water and spirits into the intestines, brandy in small quantities was given by the mouth; and the patient was recommended to take mouthfuls of beef-tea or chicken-soup, at once to support the strength, and to quench the sensation of thirst.

With these means for restoring heat, calomel and opium was generally given according to symptoms, with the view of effecting a favourable change on the gastro-intestinal actions and secretions. The usual dose for an adult was 5 grains of the mineral, with 1½ of the drug; for a child half or third of that quantity, repeated every second hour according to circumstances. Opium was also occasionally administered in the starch enema.

To show the effects of these stimulating remedies, and especially small quantities of brandy, during the state of collapse, I may remark, that in the patient, Margaret Liddell, whose radial artery I could trace like a slender wire beneath the constricted integuments, though totally void of pulsation, after a few tea-spoonfuls and one warm spirituous enema, pulsation began to be distinctly but feebly felt. Some hours afterwards, however, apparently from the attendants being rather remiss in the use of external heat, she declined, and sunk in the course of the evening. A more satisfactory case is the following, communicated to me by Mr Fife in a letter of the 23d January. "Yesterday evening, on returning to Newcastle, I saw a most interesting case at Lemmington, where the cholera has not appeared in its most developed form since you were here. Richard Davison, aged 9, had suffered from the peculiar diarrhœa 12 hours. His countenance was shrunk and livid, yet intelligent; the extremities corrugated; the tongue white, moist, and cold; the breath cold; the *pulse absent;* and the heart beating with the most laboured action. Heat was immediately applied to the surface; the pill, consisting of 1 grain of opium and 5 grains of calomel, was immediately given, and ordered to be repeated in the course of an hour. Apprehensive that I might not be enabled to see the boy for 12 hours or longer, I directed a tea-spoonful of brandy to be given every ten minutes until the pulse became distinct, then to discontinue the brandy for fear of the violence of reaction in the head, and to apply leeches to the temples. I even marked with ink the situation of the radial artery at the wrist, to assist the attendants in finding the pulse. The boy was indulged with cold water for a drink, and chicken-broth was ordered for diet. My instructions were obeyed to the letter; and to-day the little fellow is convalescent."

Of the method by friction I saw little or nothing; and I fear it is not always practicable, in consequence of the difficulty of obtaining a sufficient number of assistants. I believe, nevertheless, that, if properly practised, as recommended by Dr Molison of this place, it may in certain cases be attended with very great benefit.

To blood-letting during the stage of collapse, Mr Fife has a decided and, I am inclined to think, a very well-founded objection. Indeed, Mr Fyfe, Mr Glenton, Mr Dawson, Mr Davidson, and all those whom I saw, seemed to be of the same opinion in this particular.

The warm or hot-bath was never used at Newburn, chiefly from the conviction that it is either useless, or at most not adapted to the treatment of cholera. It seems, indeed, now to be generally agreed, among all those who have any practical acquaintance with this disorder, that the hot-bath is not only impracticable but injurious.

Since I have left Newcastle, Mr Fife has employed another stimulant during the state of collapse, and when there are slight efforts at reaction. This is mustard in the form of *enema*, the effect of which is to excite the urinary secretion. This fact, of which I received notice in a letter of the 4th March from Mr Fife, I give in his own words. "Did I mention to you that in the case of Haver at Bell's Close, who had secreted no urine for 48 hours, the secretion was restored soon after a mustard *enema* had been administered? Some gentlemen of the Medical Staff advised the trial of the same application in a similar case afterwards at Percy Main, near Shields, in consequence of my description of its effects on Haver; and I am happy to say it was followed by the same result."

In the stage of reaction or *anastasis*, on the contrary, blood-letting was in general not only indicated, but extremely beneficial. In children, I have already shown how much the cerebro-meningeal congestion required to be opposed by repeated local detraction of blood. In adults it is not less so; and perhaps most of the instances of fatal termination during reaction arose from the difficulty of permanently controlling the vascular congestion of the brain and its membranes. All the persons slightly affected at Newburn complained invariably of the *trouble of the head;* and this was always most certainly and permanently relieved by detraction of blood, local at first, while the circulation was still oppressed, and general afterwards. With this it is of great moment to keep the head elevated, to remove the hair, to apply a blister, and, even if the symptoms approach *coma* or apoplexy, to apply cold.

With these measures it is of moment to attend to the state of the alvine discharges; and for this purpose calomel has been very generally recommended, perhaps because it relieves the abdominal and portal circulation, and hence may act on the venous system of the brain. Something also must be attributed to the influence of this mineral on the capillary circulation and the secreting vessels. In a letter of the 23d January, Mr Fife informs me, that " in several recent instances in which the head symptoms did not yield to local or general depletion, much improvement was effected by large and repeated doses of calomel; and the advantage was obvious before the calomel showed its effects on the bowels."

On the obscure and perplexing subject of the pathology of cholera I have little to say. The lesion of the nervous system, which has been so generally assumed, I confess, appeared to me nowhere to exist. It was clear that neither the brain, nor the spinal chord, or their nerves were *peculiarly* affected; and I could see as little proof that the gangliar system or the solar plexus was pre-eminently disordered. These organs, indeed, partake of the general lesion of the blood-vessels in common with all others to which blood-vessels are distributed; but that they are specifically affected is, I conceive, a hypothetical assumption entirely.

All the phenomena of cholera, on the contrary, indicate in my opinion an affection of the vascular system and its contents; and in the exquisite form of the disease it bears a close resemblance to inanition of these vessels, *anaemia* suddenly induced, or the effects of profuse hemorrhagy. I do not mean to enter into any discussion of the question, whether the sero-albuminous discharge is a secretion, or by what mechanism it is effused. It cannot be doubted that it is poured forth from the blood-vessels of the intestinal tube, or the branches of the cœliac and mesenteric arteries at the expence of the serum, and much of the albumen of the blood. The effects of this are at least twofold. In the *first* place, the quantity of the circulating fluid is absolutely and most suddenly diminished; and *secondly*, by deprivation of its sero-albuminous portion its fluidity is remarkably impaired, and it is thereby rendered less capable of moving, especially in the vessels of the third and fourth classes. These two circumstances combined give cholera a character consisting partly of hemorrhage or *syncope*, and partly of *asphyxia ;* and on this singular combination seems to depend the phenomenon of the cramps of the extremities, and the tonic incurvation of the hands, and fingers, and toes. Any one who has witnessed death by sudden hemorrhage, or has seen an animal bled to death, knows that spasmodic affections of the voluntary muscles accompany the last agonies of life. Those of genuine and exquisite cholera, I conceive, are of the same nature, and depend on a similar cause. As the blood is withdrawn from the muscles of the extremities to supply the defect in the large vessels communicating with the cœliac and mesenteric arteries, and as it ceases to move through them, these muscles are affected by irregular and involuntary contractions. On this subject, however, I cannot at present dwell longer.

The question of the mode in which cholera arises and is propagated is perhaps not less difficult and perplexing. The summary method of resolving the whole into importation and contagion has been very generally adopted ; and the successive progress of the disease from the Gangetic Delta to the British shores, in the course of 14 years, has been confidently adduced as the strongest proof of the soundness of this view. Many rather hard names have been applied to those who have avowed their inability to admit the conclusiveness of this doctrine ; and some even have expressed their astonishment at the construction of the minds of those who have ventured to doubt the justice of the hypothesis of importation and contagion. I am not ashamed to say, that to this school I do not belong, and that to this logic I shall not have recourse. Every question regarding the mode in which a disease originates and is propagated among a community of human beings, *must* be matter of opinion and hypothesis, and cannot be decided either by the numbers or the weight of the names by which it is supported. It is only by a cautious comparison of well authenticated facts, so unequivocal and unambiguous as to admit of one explanation only, that this point can be determined. I shall in the following observations state the facts with which my visit to Newcastle made me acquainted, and compare them shortly with those observed by others.

The first case which occurred at Newcastle was that of the man Reay, living at the east end of the New Road, about the beginning of November. This case, which was seen by Mr Davison, was speedily fatal. The next case occurred about a month afterwards, towards the end of November, in the person of Robert Jordan, a pig-feeder, old and broken down, living at the west end of the New Road. This man, when seen by Mr Davison, at half-past one in the morning, had the tongue and extremities cold, and died at half-past ten. Neither of these two persons had any communication with Sunderland, nor had they, so far as Mr Davison could learn, any communication with each other. The next case was that of Maria Mills, a woman of the town, living in Johnston's Entry in the Sandgate. This woman was drunk and cold when first seen at ten in the morning; and she died at eleven P. M. of the same day. On the same day a married woman named Eddie, of broken constitution, and living at the east end of the Sandgate, about 100 yards from the house of Robert Jordan, was attacked, and died after the lapse of thirty hours. The fifth case was that of John Taylor, also living in the Sandgate, about 150 yards from the house where Mills lived, and which likewise terminated fatally. All these cases occurred, Mr Davison assured me, insulated and totally unconnected, previous to the 5th or 6th, he thinks, of December; after which the disease began to spread rapidly and generally in the closes and lanes of the Sandgate, and among the houses close by the lower part of the town.

The mode in which cholera appeared in the village of Newburn I have already mentioned; and I suppose every one conversant with inquiries of this kind, will agree with me in thinking, that it was not imported, as stated, into that village by Mrs Wailes or her father-in-law. In short, the time between the attack and death of Wailes, and the attack of Robson, was greatly too short to allow of any thing like communication of a morbid poison from the former to the latter, and the process of what is termed incubation.

The appearance of the disease in Gateshead is attended with similar difficulty, but of a much stronger and more insuperable character. Mr Dawson assured me, that, previous to the 24th of December, there had been 1 case only of the disease, which recovered; on the night of the 25th, it is well known, 55 persons were attacked, and 33 died within 24 hours.

But let us consider for a moment the mode in which a disease, unequivocally contagious, appears and attacks the inhabitants of a community. We can scarcely with justice adduce the example of typhous fever, because, that, though contagious enough, is never wanting among some part of a large city or town; but, to obviate all cavil, let us take plague. Look at the accounts of the Halebeen epidemics, by Alexander and Patrick Russell, of the Marseilles epidemic, those of Jassy and Kiev by Orraeus, or that of Malta by Tully, and in every one we find that first one or two persons were attacked, then a third and a fourth, a fifth or sixth, and so forth, by gradual, distinct, and successive steps. In no instance do we find at the beginning of a pestilential epidemic a dozen, or a score, or two score persons smitten in a single night. Such a sweep requires days for its production, and only takes place after many successive weeks in a large population. Thus in Aleppo in 1760, when the first cases of plague appeared on the 17th May, only 70 cases had occurred between that date and the 16th of June, a space of thirty days, and which was only 2½ per day at an average. Even in the latter end of June, when the disease was at its height, the daily funerals were about 9 or 10, and seldom exceeded 15 or 16, in a population of at least 240,000 persons. In the following year, 1761, that the disease observed a similar uniform and progressive increase, may be inferred from the weekly number of funerals in April and May, which were the following,—58, 88, 125, 113, 171, 139, 177, 290,—showing thus, with two exceptions, a regular weekly increase by about a half more in each week.

In the same manner, and upon the same principle, the disease continues long, and declines very gradually. The Halebeen epidemic of 1760 continued till the 17th of August, a space of three months; that of 1761 underwent some remission in the end of December, but extended through the ensuing year till the end of September, a space of eighteen months; and in the epidemic of Marseilles in 1721, the disease increased gradually after the 20th June, more quickly in August, declined suddenly, though partially, in October, augmented again in the quarter of St Ferriol, and declined in December and January 1722, and finally disappeared in February. The histories of all plague epidemics lead to similar results; and show clearly that the disease, when once introduced, spreads in a gradual and uniform manner, until it attains its greatest height, and in general subsides in the same uniform and progessive manner.

Let me not be misunderstood, however, on this topic. In plague, and in all other diseases of distinct contagious characters becoming epidemic, there are two circumstances, the contagion of the disease, and the epidemic constitution. Without the latter the former has often little influence; and it is evident, from the phenomena and history of pestilential epidemics, that certain atmospheric peculiarities contribute powerfully to increase the susceptibility of those exposed.

Let us now consider how much or how little of this we observe in epidemic cholera. The disease appears in several persons insulated and unconnected with each other, either all at once in the same night, or within an incredibly short space of time, so that the idea of what I denominate efficient propagation is entirely out of the question. I presume that the 55 attacks in Gateshead, mostly in one street, and one side of it, on the night of the 25th and morning of the 26th, must be given up at once as utterly inexplicable on the principle of contagion; for I remember no instance in the whole course of the annals of disease, in which such a number of attacks was simultaneously produced by such an agent. I am, on the contrary, acquainted with many examples of numerous simultaneous attacks of disease depending on miasmatic or atmospherical causes, and presenting in this respect a close analogy to that of the invasion of the Gateshead epidemic. I shall simply advert to the remarkable one recorded by Lancisi, of 30 ladies and gentlemen of the first rank in Rome, who, on an excursion of pleasure to the mouth of the Tiber, were exposed to a sudden change of wind blowing from the south over the marshes, and 29 of whom were immediately seized with tertian fever. Instances of this kind, however, which could be multiplied with great facility, have not for a long time, and are never now considered as proofs of contagion; and, indeed, it is given by Lancisi as an example of a morbific cause of a different kind entirely, that of *miasma*, or what has recently been named *malaria;* and I presume that the Gateshead case must either be at once relinquished, or ascribed to some similar agent.

The example of Newburn is equally strong, so far as a small place and a limited population can be compared with a large and populous one. Between the night of the 10th and morning of the 11th, 16 persons were attacked with diarrhœa or choleric symptoms, 13 of whom had pure cholera, and of these 12 died in the course of 30 hours. Nine of the pure choleric cases, it must also be remarked, were on the Tyne side of the village. The attacks went on at the rate of from 10 to 12 every night, with various degrees of severity; and before a revolution of seven days was completed, 36 persons had been cut off by the disease, or at the average rate of 6 daily. I must confess my ignorance of any contagious disease that appeared in this sudden manner, and made such rapid havoc among a community so limited; and I think no resource is left but to admit the spontaneous, the malarial, or the atmospherical origin of the malady.

With these facts, let us compare those attending the appearance of the disease in Astrachan, Moscow, and St Petersburg. Had cholera been capable of introduction, it is reasonable to think that it might be excluded by the rules of the seclusive and non-intercourse system. Each of these cities, accordingly, was placed under a rigid system of seclusion and separation from infected places by means of strong lines of military posts and barriers, which in the case of Moscow were twofold. Notwithstanding these precautions, however, the disease appeared in every one of these cities, and without the possibility of tracing it in any instance to unequivocal importation.

The example of the kingdom of Hungary is perhaps still more forcible. Never, perhaps, was such a rigid and perfect system of non-intercourse enforced as that which was instituted on the southern, northern, and eastern boundaries of Hungary, when the disease appeared in Poland. Every defile of the Carpathian mountains was guarded with strong military posts, and watched with the utmost vigilance. Neither human beings, goods, nor brute-beasts, except perhaps an occasional wolf or bear, could penetrate into the Hungarian territories, unless at the muzzle of the firelock, or the point of the lance. Yet how vain these precautions proved, was evinced in the course of a few weeks. For the disease appeared on the Hungarian side of the Carpathian chain in the month of June, and spread most rapidly through the towns situate on the banks of the rivers of that well-watered country. It will not do in this case to say that the sanitary lines were broken in the ordinary sense. Broken they no doubt were; but by no human power.

It would lead me into too wide a field to attempt to consider the circumstances under which the disease originated in all of the places in which it has yet appeared. But there are some circumstances which deserve attention, and may tend, by means of the facts collected subsequently, to throw some light on the origin of this singular disease.

In the *first* place, though gastric and gastro-enteric disorders were general in Newcastle during the months of September, October, November, December, and January, genuine choleric cases were confined chiefly to the low, damp, and imperfectly ventilated lanes and closes in the Sandgate, and close by the banks of the Tyne. Many cases occurred in the Close, a low, damp, narrow street, running parallel to the north bank of the Tyne, with a steep bank behind it, on which stands the castle and other elevated buildings. How much such a situation obstructs the circulation of the damp air of the river, and favours the sojourn of any miasmatic or morbific vapour, is too obvious to require illustration.

In the *second* place, it is remarkable that the disease in Gateshead was not only confined principally to Pipewellgate and Hillgate, two streets running parallel to the Tyne, but the great majority of the first cases took place in the inner or land row of Pipewellgate, the houses of which are built against a steep bank rising behind them. This circumstance seems to justify the inference, that, as the wind began to blow on the night of the 25th from the north, it had wafted some miasmatic vapour from the bank of the Tyne, which might have been perfectly harmless, had it been carried further, and dispersed over the country, but which, when striking on this steep bank, was arrested, and thereby rendered capable, with the terrestrial emanations, of affecting the persons of the inhabitants with some specific poison. Had it been mere miasmatic vapour from the Tyne bank, or even choleric air from Newcastle, as was stated by several, then it ought to have first affected the nearest row of houses, the inhabitants of which, however, were only attacked on the next or the second night after.

The case of the Newburn village is not less in point. The first case, that of Thomas Robson, about the 30th of December, occurred in a house, not indeed near the Tyne, but standing close by the Newburn rivulet, which flows into that river. The next cases occurred in houses all standing between the Tyne and the rivulet, so that the vapour of both streams must have been united; and most of the early cases occurred on the Tyne side row of houses. Though this may seem a contradiction with what took place at Gateshead, it merely serves, I conceive, to confirm more strongly the view already given of that occurrence. The ridge on which the Tyne side row of houses is built, is just sufficiently elevated to intercept the fluvial vapours; and most of the cases took place in the back or south houses, which are really built on the sloping bank of this ridge.

In adducing these facts, I do not feel prepared at present to assert that they are perfectly adequate to account for the origin of a disease such as spasmodic cholera; but, as I conceive that no satisfactory proof has yet been adduced to show that the disease was imported from places where it was previously prevailing, and hence regard it as unphilosophical to assume a principle without sufficient evidence,—I think it of some moment to point out certain physical and local peculiarities of the situations in which the disease has been most prevalent, to enable others to determine if these correspond with the physical peculiarities of other places in which it may subsequently appear. I must confess that, after careful inquiries made both by Dr Cobb and myself, we could not find any reason to believe that the banks of the Tyne are productive of ague or any other miasmatic disease. It does not follow, nevertheless, that they should be exempt from those resulting from atmospheric causes, or the influence of agents operating through the atmosphere; and if on this point I hazard a conjecture, it would be, that certain atmospheric conditions operating on peculiar localities are most likely connected with the origin of malignant cholera. The banks of the Wear at Sunderland *are* productive of remittent fever. I have no purpose to serve, further than to ascertain the truth; I have hitherto adopted no positive opinion as to the contagious or non-contagious character of the disease; and I have been for the last six months searching in vain for facts, which admit of no other explanation save that of introduction and contagious propagation.

But I must further remark, that, had cholera been capable of being conveyed *from* the locality in which it was prevailing *to* another, there ought, it may be argued, to be distinct proofs that it was so conveyed from Newcastle or Sunderland, or both, to other places. Allowing, for the mere sake of argument, that it was conveyed from Sunderland to Newcastle, what are the proofs that it was conveyed from the latter town to the places with which communication is most frequent and unrestrained? There is no doubt that the disease appeared at different times in the various hamlets and townships on the north bank of the Tyne from Tynemouth almost up to Newburn, Wallbottle, and even Corbridge, at which four cases were said to have occurred on the 13th, two of which were fatal. But while the disease was thus roaming about on the north side of the river, it is remarkable that, with the exception of South Shields and Gateshead, it was scarcely known on the south side. At Swallwell, indeed, since I left, a few cases had occurred, but nothing to constitute an epidemic. Though during the whole time of the epidemic, the intercourse between Newcastle and the neighbouring towns was extremely frequent and uninterrupted, no case of cholera had appeared. One example or two must suffice. There are few towns, perhaps, with which Newcastle has more intercourse than with Morpeth, an intercourse, I may add, conducted by persons who might act the part of very good and perfect conductors of any contagious disease. Regularly as the Wednesday returns, crouds of butchers and persons connected with the sheep and cattle trade flock from Newcastle to Morpeth. What circumstances could be more favourable, I ask, for the propagation of a contagious distemper? Yet, after most particular inquiry, I could not learn that the disease had appeared in the latter town. One gentleman, it is said, was attacked suddenly in his gig with symptoms said to indicate cholera, and died in a few hours; but this, if actually true, would be rather against the idea of contagion, since it appeared to be spontaneous in origin, and certainly was not followed by other cases.

It has been generally presumed, that cholera was conveyed from Newcastle to Haddington. But why it should have stopped exactly at this point, two stages from Edinburgh, why it did not halt at Morpeth, at Alnwick, at Belford, at Berwick-on-Tweed, &c. &c. why it did not at once proceed to Edinburgh, are points, with the explanation of which we have not yet been favoured. Both in Haddington, and afterwards in Musselburgh, so far as I could learn after most diligent inquiry, the disease sprung up spontaneously, whatever be the mode in which it was afterwards propagated.

I have further, however, to remark, that cholera is peculiar in vanishing as rapidly and suddenly from a place as in appearing. In Gateshead, the whole epidemic was over in about 3 weeks; and on the 16th of January, there was scarcely a well-marked case to be seen. In Newburn, it was over in about 15 days' time; the cases which occurred after the 23d of January were straggling relics of the epidemic; and on the 2d of February, only 22 days from the proper commencement of the epidemic, it was extinct. I am certain that no instance either of a febrile, a plague, or a small-pox epidemic, or indeed any disease unequivocally contagious, ever terminated in a period so short; and the rapidity of its course, and the suddenness of its subsidence, exceed even those of yellow fever epidemics. This character in the history of cholera has been since my return most forcibly illustrated in our own neighbourhood. On Wednesday the 18th January, I believe there was not a case of cholera in Musselburgh; on Thursday morning it appeared at various points of the town and vicinity; rapidly attained great virulence, and produced much mortality, in Fisherrow especially; and is at this moment (2d March) almost extinct. There is, I believe, no example of a contagious disease running a course so rapid in a space of time so short.

As to the mode in which the disease, when once introduced, by whatever means, is diffused through a community, a few words will suffice. It must be admitted that it did run in families, two, three, or four of which were usually attacked; and this perhaps might be regarded as the strongest possible proof of contagion. This circumstance, however, must be accompanied with the qualification, that two or even three of a family were often attacked at once, or within so short a time of each other, that it is difficult to see how the disorder could have been communicated from the one to the other. I grant, that, on the period of intercourse necessary to communicate the disease, we have no exact information; and that we neither know whether one hour or one day is requisite; but we witnessed numberless instances in which the closest contact and the freest intercourse for some time was not followed by any attack. It must also be kept in view, with regard to the fact of families being attacked in Newburn, that this indicates equally the influence of the same local causes, since all were living in the same house, breathing the same air, using the same food, and exposed to the same local emanations. In one sense, indeed, the fact speaks more strongly against than in favour of contagion, since even in plague sometimes not more than one person in each family shows the marks of the pestilential poison.

Another fact which shows the non-contagious nature of cholera is the perfect immunity enjoyed by medical men, nurses, and other attendants, when not exposed to local causes, dietetic errors, or improper regimen, want of sleep, or the depressing emotions and passions. In Newcastle no medical attendant was attacked except one, Mr Turner, who was living in one of the sickly districts, viz. the Sandgate, and who was deprived of sleep for several successive nights in his zealous and benevolent services to the poor in his vicinity. Mr Turner was affected with serous diarrhœa only, and though much harassed with this, was never out of his surgery. It gives me pleasure to add, that this meritorious individual was convalescent when I saw him, though his mouth and face were still much affected by the calomel which he had taken. None of the nurses, so far as I could learn, of either of the three cholera hospitals, had been attacked; and Mr Riley, the superintendant of the Castle Hospital, though he slept in an apartment with a closed window, and with a communicating door from the cholera ward, never, he assured me, had a symptom of the disease. The Castle, I may add, stands on an elevated platform raised at least 100 or 120 feet above the level of the Close, and perhaps 150 feet above that of the Tyne. In Newburn Mr Rule, one of the village apothecaries, was attacked; but he was an elderly man, rather feeble in appearance, residing also in the locality, and it is said *plus æquo Baccho deditus.* As a counter part to this, let me add, that Mrs Rule and her sister were both attacked before Mr Rule; all circumstances I fear to be ascribed to the general operation of local and atmospherical causes.

For several days, both at Newcastle and Newburn, Dr Cobb Mr Little, and myself, were as close to the persons of from 20 to 40 choleric patients, in different stages of the disease, as the examination of their pulse, tongue, skin, &c. required, and in several of the most exquisite cases, as the exploration of the chest and the sounds of the heart required; yet neither of us sustained any inconvenience. Mr Fife, also, who, with his pupils, Mr Atkinson and Mr Haussman, was for a longer period about these cases, has suffered no symptom of the disease.

Let me not, however, perform the part of the special pleader. My friend, Mr Fife, for whose judgment I have great respect, was rather inclined to think that the disease, in whatever mode introduced, was communicated from one person to another; and his reason for this opinion, in addition to the fact of its running in families, was that in several instances he saw infants at the breast very speedily affected after the mothers were attacked. Thus he mentioned to me the remarkable fact, that after Mrs Dodds of Bell's Close was attacked on the 29th of December, the infant was attacked with coldness, paleness, and one or two loose stools, and died at the end of two hours. Of the case of Ann Veitch, the infant daughter of Jane Veitch, I was myself a witness. The mother was attacked on Friday, and the child very soon after; and both died. Several similar cases Mr Fife had witnessed; and he therefore was in the habit of prohibiting mothers who were attacked from continuing to suckle their infants. Though facts of this kind are certainly rather favourable to the idea of the contagious nature of the disease, they are not, I must observe, perfectly conclusive. The infant is exposed, it must be remarked, to the same epidemic and local causes as the mother, and is quite as liable to be affected by them. Thus the child, Bell Trotter, who had been weaned, and therefore was not exposed to the intimate personal communication of its parent, was, nevertheless, affected by the disease; and the same may be said of other infants in the village.

To demonstrate at once the influence of locality, aided by a powerful depressing passion, I must notice the case of Mary Newton, the sister of Mrs Veitch. This girl, who had come to nurse her sister, was about 22 years of age, unusually well made, in the vigour of youth and health, of a figure and appearance singularly interesting, and had it not been for a slight tinge of reddish hair, was justly entitled to the character of rather more than a village beauty. She was involved in the deepest distress and anxiety about the fate of her sister and the infant, both of whom were already ill; but on the 15th, when we first saw her, she was still unaffected by the disease. The following day, I thought her face looked blanched; and my attention was for a moment withdrawn from Mrs Veitch, who was evidently better, by the striking contrast which the wan cheek and sinking eye presented to the blooming countenance and animated expression of the previous day. On feeling for the radial artery, the skin was cold, and the pulse gone; yet she gave a sort of evasive answer that she was well. I begged Mr Fife, when the examination of Mrs Veitch was finished, to look at her; and we found on inquiry that she had been attacked the previous afternoon with diarrhœa, which had continued during the night and morning, and that she had cramps of the legs. The urine, however, continued to be secreted, notwithstanding that she was fast verging to the stage of collapse. The calomel and opium pill, with small quantities of brandy and chicken soup, was prescribed. The unhappy girl, however, had too long concealed her complaints, by at least 8 or 10 hours; and the disease had already made deep inroads upon her frame. She went home that evening to her father's, and died the following day. None of the family of the father took the disease. To the absolute advocate of contagion this case would appear an example of communication of the disease from the sister, Mrs Veitch. Knowing as I do all the circumstances of the case, and, above all, its locality, the house at the west end of the village adjoining the parsonage, I have no hesitation in viewing it as entirely originating in the epidemic constitution hanging over the low and humid locality of the village, aided most powerfully by the deep affliction and distress in which the girl was involved on account of her sister and the infant of which she had charge.

In conclusion, I must say, that, with the exception of the strong cases of the infants at the breast, which, nevertheless, I think may be ascribed also to general epidemic causes, I met with no fact or set of facts which could unequivocally warrant the inference that the disease is communicable from one person to another. Had it been so, the disease would not so soon have subsided in a town like Newcastle; and it must have extended to the neighbouring towns, as Morpeth and Alnwick or Wooler, with which intercourse is free and unrestrained. I have scarcely myself even attempted to explain the origin of the disease, because I doubt whether we have sufficient facts to do so; and of the remote causes of disease in general, the greatest wisdom is to acknowledge our ignorance. It is, nevertheless, pretty evident to me, that a disease which originated spontaneously in 1817, not merely at Jessore, for this is a mistake, but at Behar, at Dacca, at Patna, at Dinapore, in the district of Nuddeea, and the Province of Sylhet, all so simultaneously, that it was quite impossible to say which was the first place attacked; and that the only certain fact is, that Jessore was *not* the first place,—might originate spontaneously at any subsequent period in any town or community similarly situate. I will not disguise the fact, that, according to this view, we must have recourse to the hypothesis or assumption of the epidemical constitution of the atmosphere. This, however, I reply, is a less violent assumption than that of contagion, and it is one of which we have at least evident proofs,—one which Sydenham did not regard as unfounded, and which his accurate observation and long experience assured him was necessary to explain the epidemic sickliness of London,—a city then about one-tenth of its present extent, and containing not one-third of its present population.

Let me add, also, that since the hypothesis of contagion requires the employment of this auxiliary; even on this view, the hypothesis which dispenses with contagion is the more philosophical of the two. Is there any thing more unreasonable in denying the influence of contagion in cholera than in influenza, which no one now thinks of regarding as contagious, and which may always be traced to general atmospheric constitutions? The alarm and horror created by so many sudden deaths, I am satisfied, is the principal cause of all the dread of contagion; and after this subsides, when men can examine the subject coolly and dispassionately, they will be astonished at the excessive fears which have been entertained, and the strong and confident language which has been used. Coincidence in time and place, it cannot be too frequently repeated, or even succession, do not positively indicate the relation of cause and effect. It is the invariable and uniform succession only which do so. A long lapse of observation, however, is requisite to rid mankind of these prejudices. Not more than seventy years ago, the great authorities of our profession, Hoffmann, Lautter, and Cleghorn, regarded agues as contagious, because they affected great numbers of individuals at once; and the errors of these distinguished observers long served as established tenets to the multitude of their followers, who never think but what some eminent person has thought before. Even Morgagni, good observer as he was, talks of epidemic apoplexies, —a much more rational thing certainly than contagious agues. These days, however, have passed away; and if any man now express an opinion that ague is contagious, it can be only charitably imagined that he must have lived some sixty years ago, or that he knows nothing of the history or etiology of the disease. A similar revolution, I trust, will take place with the etiology of this new and fatal malady. When the danger has blown past, and the panic has subsided, the subject will be investigated with greater deliberation and less bias. I will not commit the error which I have been labouring to deprecate, by predicting the result. But, in the present stage of the inquiry, I am satisfied that nothing has yet occurred to prove, unequivocally or decidedly, the operation of a contagious principle.

Though cholera, however, is not a disease originally contagious, I will not venture to say what may take place in circumstances of peculiarly dense, unclean, and indigent population. There is nothing impossible in supposing that a disease not originally capable of producing its generative principles may, in the crowded and filthy habitations of a very impoverished, relaxed, and immoral population, beget a disease similar to itself, and capable of spreading from one individual to another. This doctrine, originally proposed by the ingenious and well-informed Dr James Lind, of Haslar Hospital, and afterwards espoused by Baron Humboldt and many others regarding yellow fever, may prove, on examination, to be applicable to cholera. At present, however, I must remark, that I have not, after a good deal of inquiry, been able to find a single example in Musselburgh or Fisherrow, which could be unequivocally explained on this modified ground.

Since writing the above observations on the resemblance between the symptoms of choleric collapse and those of the combination of hemorrhage and *asphyxia*, I have received the essay of Mr Samuel Dickson of the Royals, in which I observe he adopts very nearly the same view. This coincidence is to me rather a confirmation than any thing else, though I am not prepared to admit, with Mr Dickson and Dr A. W. Philip, the lesion of the 8th pair. As to priority, I am rather indifferent. But I must remark, that I had adopted this view from the Newcastle and Newburn cases, and I had stated it to a gentleman, Dr John Scott of Barnes, near Richmond, who, in the mail, on my return to Edinburgh, recognized me as a former Infirmary House Surgeon, though I had not, till then, the pleasure of knowing him. It was gratifying to me to find that Dr Scott, who had seen the disease in India, and treated many cases of it, quite agreed with me as to the stage of collapse being similar to the *anaemia* or inanition produced by profuse hemorrhage.

I cannot conclude this paper without making my acknowledgments to Mr Fife for the attention which he gave to all my inquiries, both while at Newcastle and since my return. This acquires in my eyes a higher value, because I know from what I witnessed, that the whole of his time not spent in necessary repose, was devoted with unremitting assiduity and vigilance to the alleviation of the violence of the epidemic among a number of persons, varying on some days from 30 to 50, in the scattered hamlets on the north bank of the Tyne. Mr Fife has seen and treated 477 cases of choleric diarrhœa, cholera, or malignant cholera, in the following places:—

Situation.	Cases.	Deaths.	Situation.	Cases.	Deaths.
Newcastle,	43	20	South Shore,	9	2
Scotswood,	8	2	Gateshead,	8	1
Lemmington,	12	3	Quarryhouses,	5	0
Bell's Close,	37	7	Walbottle,	4	0
Benwell,	2	1	St Peters,	8	3
Newburn,	320	55	Denton,	3	1
St Lawrence,	12	1	Bigges Main,	1	1
Swalwell,	4	0	Renton,	1	0
	438	89		477	97

This gives a proportion of mortality of nearly *one-fifth* of the whole number of attacks; and is most important, in showing to what a pre-eminent extent the village of Newburn, in which three-fifths of the population were attacked, suffered under the influence of the epidemic. This circumstance, I conceive, demonstrates remarkably the influence of local causes.

PART II.

CRITICAL ANALYSIS.

ART. I.—*A Treatise on the Diseases of the Heart and Great Vessels, comprising a new View of the Physiology of the Heart's Action, according to which the Physical Signs are explained.* By J. HOPE, M. D. formerly House-Physician and House-Surgeon to the Royal Infirmary of Edinburgh, Extraordinary Member, and formerly President, of the Royal Medical Society of Edinburgh, &c. &c. London, 1832. 8vo. Pp. 580.

AMIDST the numerous difficulties by which the accurate diagnosis of diseases of the heart is attended, none hold so conspicuous and important a place as those which arise from the vague and imperfect knowledge we possess of its healthy action. If any one will interrogate himself as to the amount of the precise, established, and indisputable facts he possesses on the actions and sounds of this organ in the usual state called health in the majority of individuals, he will be astonished at the small proportion of information which can be truly said to be entitled to this character. It has been disputed, for example, what is the exact cause of the beat of the heart being felt against the ribs, whether it impinges against them during the *systole* or the *diastole.* Though it is known that the two auricles contract simultaneously, and the two ventricles also simultaneously, it is not determined what is the order of contraction, whether the auricles or the ventricles precede, nor whether these chambers are wholly emptied at each contraction. A still greater degree of obscurity and uncertainty hangs over the nature and causes of the sounds emitted by the heart and its constituent parts; and the difficulty of the subject has been very distinctly proved by the different opinions on this subject, entertained by the most eminent observers for accuracy and diligence.

Among those who have been exerting themselves to disentangle this inquiry of its complications, and to furnish to the physician a solid and satisfactory basis for his stethoscopic inquiries, Dr Hope is entitled to a distinguished place. Impressed with the conviction of the indispensable necessity of knowing healthy action and its demonstrations, in order to study with any facility and advantage the morbid deviations, he has, with equal perseverance and ingenuity, undertaken to determine experimentally the connection between the action of the heart and the sounds heard by auscultation.

The first point for determination in this inquiry, was to ascertain whether the contraction of the auricle precedes or follows that of the ventricle; and though Dr Hope had, from various analogical arguments and experiments on small animals, arrived at the conclusion, that the contraction of the auricle precedes that of the latter, he still wished to decide the point absolutely by experiment. As the great obstacle to this inquiry is the rapidity of the motion of the heart, Dr Hope retarded the circulation of rabbits, by previously depriving them of sensibility, and thus resolved the series of actions into their constituent parts for deliberate observation. He then found the auricle contract first, not slowly, but with a rapid and almost instantaneous motion. The moment the blood reached the ventricle, that part of the organ started up, evidently by the contraction of its fibres on the contained fluid, and not by mere passive distension. Simultaneously with this springing motion, the *apex* began to be retracted towards the base, and was also thrown forwards, while the long axis of the heart assumed a more horizontal direction. The *apex* was still more retracted, and the sides approximated mutually, while the whole ventricle was elevated forwards, and its long axis rendered still more horizontal by the distension of the auricle, which attained its greatest extent in the same progression as the ventricle underwent extreme contraction.

In a frog, in which the action of the heart was reduced to fifteen or twenty beats in the minute, after the ventricle lay at rest for a short space, partially distended with blood, the auricle contracted with a short smart motion partially, while the *sinus venosus* remained full of blood. On the relaxation of the auricle, the ventricle suddenly sprung up on its base, shortened its fibres, and expelled its contents slowly. After the completion of this *systole*, which was indicated by the pale colour of the ventricle, *diastole* took place, the partial infusion of blood being indicated by the return of the red colour; and in this state the ventricle remained quiescent for a short space, till again stimulated by the auricular contraction. As the same train of phenomena, it was believed, could be traced when the heart beat forty times in the minute, the objection, that the action of the heart was preternaturally slow, was set aside as of little or no moment. From these observations, with other arguments, therefore, Dr Hope conceived himself entitled to draw the following inferences.

1*st*, That in small animals the auricular *systole* took place immediately before the ventricular, and not after, as supposed by Laennec. 2*dly*, That the impulse and first sound depend on the ventricular and not on the auricular contraction, he infers from the fact that the arterial pulse, the impulse, and the sound, coincide so nearly that they can only be ascribed to a single cause, and that in the case of disease morbid changes in impulse and sound correspond with morbid conditions of the ventricle only.

It was still a most important point to determine the origin of the second sound. It was evident that it did not depend on auricular contraction, since that had been already shown to precede, whereas the second sound followed, the ventricular systole. Nor could it depend on closure of the auriculo-ventricular valves, which also takes place at the beginning of the ventricular systole. There were reasons equally strong against its resulting from any action of the semilunar valves; and, in short, it was a point on which there was as yet no positive or satisfactory information.

" As this sound," says Dr Hope, " is sometimes attended with *bruit de soufflet*, a phenomenon referable to the motion of the fluids, it was manifest that the natural sound, likewise, was in some way created by the same circumstance—the motion of the blood. Hence it became a question, what was the nature and cause of the motion of the blood accompanying the second sound: in more general terms, what was the state of the ventricles, with reference to the fluids, at the moment when the second sound occurred, and during the subsequent period of repose?

" It was irrational to suppose that the ventricle, after its contraction, remained permanently braced during the interval of repose; as such a supposition would imply unintermitted labour of the muscle. I was therefore compelled to admit a relaxation, and this involved an ulterior admission, that of a diastole or expansion; not only because the relaxation of a muscle presupposes the elongation of its fibres, which renders a diastole inevitable, but because, granting the ventricles to be merely passive during their relaxation, the gravity of the blood in the auricles, aided by the *vis a tergo*, would cause its descent into the ventricles, and thus create a diastole. I had, furthermore, observed in the frog, when the heart was acting slowly, that the ventricular systole was followed by a diastole and partial distension with blood independent of the auricular contraction, and that the ventricle remained quiescent in this state of partial distension, until again stimulated by the auriclar contraction. These phenomena occurring during action of the heart rendered artificially slow, afforded a presumption (I do not say more) that the same occurred in animals the action of whose heart was naturally slow.

" Was, then, the influx of blood accompanying the ventricular diastole the cause of the second sound? An objection seemed to present itself in the circumstance that the sound was louder and smarter than could be easily accounted for on the supposition of its being produced by so indolent an action as the descent of blood merely by its own gravity and the venous *vis-a-tergo.*—An active dilating power appeared requisite. To suppose that this power resided in the muscular fibre, involved a contradiction, as it was tantamount to saying that a muscle could relax actively. That it did not reside in the resiliency of the lungs was certain, because the heart continues to act though the lungs be collapsed. The only remaining cause to which an *active* dilating power could be referred, was, the ventricular elasticity, and this appeared scarcely adequate to the production of the effect.

" Notwithstanding these apparent objections, pathological observations, corroborated by what I had seen in the frog, led me to infer that an influx of blood into the ventricles at their diastole *did* occur, and with sufficient energy to produce the sound in question;—for I had found that, in hypertrophy and dilatation, the second sound was accompanied by a very strong shock, which, from its appearing to be of a *receding* nature, I have, for five or six years, designated in my case-books by the epithet *back-stroke;* and this motion, and the accompanying sound were, *cæteris paribus,* stronger in proportion as the hypertrophy and dilatation were greater. Still, however, that the influx of blood during the ventricular dilatation, was the cause of the second sound, was only conjectural, and it required demonstrative proof before it could be assumed as a fact.

" How, then, was this, and the collateral questions to be determined?

" It appeared to me that the only possible mode was, by contriving to hear the sound at the same moment that the action of the heart was inspected and felt; since it could thus be unequivocally ascertained with what motions the sounds respectively coincided. Small animals were obviously insufficient for this purpose, as in them, the sounds are too indistinct, the motions too rapid, and the impulse too feeble, to afford satisfactory data. To the larger animals, therefore, I at once turned my attention, as presenting the only means likely to lead to a solution of the difficulty.

" The whole subject, then, seemed to resolve itself into the following questions, which I drew out and proposed to my coadjutors, before the operation, as the points for investigation:—

" 1. Do the auricles contract immediately before the ventricles?

" 2. Does an interval occur between the two contractions, or is the succession so rapid as to amount to continuity of action?

" 3. Does the ventricular contraction cause the impulse, pulse, and first sound?

" 4. Do the ventricles contract completely, and do they remain closed and empty, during the interval of repose? Or—

"5. Do the ventricles dilate again immediately after their systole; and is this dilatation attended with an influx of blood from the auricles?

"6. Is the influx of blood into the ventricles during their diastole the cause of the second sound? If not—

"What is the cause of the second sound?"—Pp. 17–21.

We regret that our limits do not allow us to give the details of the experiments to which these inquiries led. It is necessary, however, to say, that they were performed in so cautious a manner as to insure accurate results, and in the presence of so many observers, as to obviate as much as possible every fallacy, and to satisfy the doubts of the most scrupulous. The conclusions which were drawn from the results of these experiments regarding the motions of the heart, the sounds, the rhythm, and the relative duration of each stage of the process were the following.

"*Of the Motions of the Heart.*—1. The auricles contract so immediately before the ventricles, that the one motion is propagated into the other, almost as if by continuity of action; yet the motion is not so quick that it cannot readily be traced with the eye.

"2. The extent of the auricular contraction is very inconsiderable, probably not amounting to one-third of its volume. Hence the quantity of blood expelled by it into the ventricle is much less than its capacity would indicate.

"3. The ventricular contraction is the cause of the impulse against the side; first, because the auricular contraction is too inconsiderable to be capable of producing it; second, because the impulse occurs after the auricular contraction, and simultaneously with the ventricular, as ascertained by the sight and touch; third, because the impulse coincides with the pulse so accurately as not to admit of being ascribed to any but the same cause.

"4. It is the apex of the heart which strikes the ribs.

"5. The ventricular contraction commences suddenly, but it is prolonged until an instant before the second sound, which instant is occupied by the ventricular diastole.

"6. The ventricles do not appear ever to empty themselves completely.

"7. The systole is followed by a diastole, which is an instantaneous motion, accompanied with an influx of blood from the auricles, by which the ventricles re-expand, but the apex collapses and retires from the side.

"8. After the diastole, the ventricles remain quiescent, and in a state of apparently natural fulness, until again stimulated by the succeeding auricular contraction.

"*Of the Sounds.*—9. The *first sound* is caused by the systole of the ventricles.

"10. The *second sound* is occasioned by the diastole of the ventricles.

"*Of the Rhythm.*—Order of succession—

"1. The auricular systole.

"2. The ventricular systole, the impulse, and the pulse.

"3. The ventricular diastole.

"4. The interval of ventricular repose, towards the termination of which the auricular systole takes place.

"*Duration.*—This is the same as indicated by Laennec, viz.

"The ventricular systole occupies half the time, or thereabout, of a whole beat.

"The ventricular diastole occupies one-fourth, or at most one-third.

"The interval of repose occupies one-fourth, or rather less.

"The auricular systole occupies a portion of the interval of repose."—Pp. 28—30.

The experiments were afterwards repeated on the 10th of August 1831, chiefly with the view of ascertaining and verifying the accuracy and uniformity of the results formerly obtained; and the following conclusions appeared to be legitimately derived.

1. The ventricular *systole*, the first sound, the cardiac impulse and the arterial pulse coincide perfectly, except that sometimes there appeared to be an interval barely appreciable between the impulse on first motion of the ventricle, and the pulse of the radial artery under the shoulder. This interval was ascribed to the distance of the artery from the heart; because in the near arteries it is not observed, and it is proportionally greater in the more remote ones. It is important to remark, that it is very distinct in the human subject.

2. In consequence of the opacity of the ventricular *parietes*, it is impossible to demonstrate whether they expel their contents completely or not. The diminution of volume during the *systole* is not so considerable as to justify the inference that they do. In the interval of quiescence they are full but not distended. The question, whether the ventricles expelled the whole of their contents or not, originated in the opinion that they did, and that the adhesion of their internal surfaces occasioned the second sound. As it was proved, however, by the former experiments, that the second sound resulted from the *diastole*, the determination of the question became a matter of indifference.

3. It was ascertained that the second sound coincides with a motion cognizable by touch and sight, by which the ventricle returned from its *systole* to the same state with respect to size, shape, and position, as before, and which is the *diastole* or relaxation.

4. The auricles evidently contract before the ventricles. The quiescent interval commences between the ventricular *diastole* and the auricular *systole*, and lasts during the space of the latter process to the next ventricular contraction.

5. The auricles contract very slightly, and principally at the

appendix, the motion proceeding vermicularly into the ventricular systole.

6. The auricles are never empty, but are constantly full and verging to distension during their motions. It is further to be remarked, that during the quiescence of the auricles in this second series of experiments, both the first and second sounds were heard, and the corresponding motions, the systolic and diastolic, were recognized,—a convincing proof that the second sound is connected with ventricular motion.

We think it must be admitted, as an evident result of these experiments, that this question regarding the true cause of the second sound in the stethoscopic beat of the heart is completely decided. It appears impossible to doubt that this sound is associated with the influx of blood into the ventricle; and it is very probable that it depends, at least in part, on this cause. With regard to the question of the immediate cause or causes of the diastole, how much of it is a passive state, how much an active, we afterwards find the following observations :—

> " The *diastole* appears to be occasioned by several concurrent causes, viz. 1. That power of the muscle (whether elasticity or something more, is unimportant) by which it reverts from the state of contraction to that of relaxation, and in virtue of which it exercises a degree of suction. 2. The distention of the auricles, which is greater at the moment of the diastole than at any other, as they have been filled during a longer period—namely, that of the ventricular contraction or half of a whole beat. 3. The weight of the ventricles collapsing from their systole on the distended auricles beneath them. 4. The width of the auriculo-ventricular orifice, which allows the blood to shoot in with instantaneous velocity. It is manifest, that, as so many powerful causes conspire to effect the influx of the blood, an auricular contraction at this time, and for this purpose, as imagined by Laennec, would be superfluous. The draught of blood from the auricles during the diastole, causes the slight retraction of these cavities observable at that moment."—Pp. 44, 45.

These considerations lead the way to the explanation of the second, or, as it may be now termed, the diastolic sound. " When the diastole takes place," says Dr Hope, " the blood, put in motion by a number of concurrent circumstances already particularized, shoots with instantaneous velocity from the auricles into the ventricles; and the reaction of the ventricular walls on its particles, when their course is abruptly arrested by the completion of the *diastole*, is, I conceive, the cause of the loud, brief, and clear sound."

These principles the author afterwards employs ingeniously to explain the modifications which the different sounds undergo, in consequence of changes in the structure, either of the heart itself, of its valves, or diminution or enlargement of its chambers, or the communicating apertures. Our limits do not permit us to follow the author in this part of his inquiry. But we recommend to the particular attention of those who are desirous to understand this subject, his ingenious observations on the mechanism of morbid valvular murmurs, and the different causes from which they may proceed.

Another department of this subject, of a nature still more curious, and not less practically useful, is the disquisition on the mechanism of murmurs of the heart and arteries, independent of organic disease. The frequency with which the action of the heart is liable to become deranged, from the operation of causes purely nervous, invests this subject with peculiar interest; and the remarkable, and not unfrequently alarming, train of symptoms which may ensue in consequence of mere loss of blood, so satisfactorily traced from its origin to its termination, in the present work, and so liable to be mistaken for organic disease, renders it a matter of duty in the physician to be intimately acquainted with it.

It is well known that the bellows-sound and its varieties, and the purring thrill, were remarked by Laennec to be conspicuous, in being, so far as is hitherto known, wholly unconnected with organic lesion of the heart or its parts. It is also known how much Laennec was perplexed to explain these sounds, and into how many inconsistencies his ingenious attempts at explanation betrayed him. He was, indeed, in the latter part of his researches, driven, by indisputable facts, to ascribe the bellows-murmur to spasm of the heart, in which, as a muscular organ, this was certainly possible. But a formidable objection to the justice of the explanation was met in the circumstance, that the sound in question is frequently traced to some one of the large arteries. The explanation of the purring thrill, he gave up entirely as impracticable. Dr Hope, after premising that he found the murmur in the case of the heart accompany the *systole*, and not the *diastole*, as stated by Laennec, but in the arteries the diastole, proceeds, in explaining of these phenomena, to make the following observations :—

> " Both by experimental and pathological evidence, I am led to believe that the murmurs and tremors, as well in the heart as in the arteries, are occasioned by modifications in the motion of the fluid. To establish this point, it is necessary to prove, 1. That liquids permeating tubes, do occasion sound ; 2. That modifications calculated to elicit the sounds, do take place under the circumstances in which the sounds occur. 3. That the explanation applies equally, whatever be the circumstances under which the sounds occur.
>
> " 1. That a bellows sound is produced by the transmission of a

fluid, without any intermixture of air, through a tube, though questioned by some, is a fact too easy of demonstration to require discussion. Having just returned from a repetition of the experiment, —one which I have frequently performed, I find the rushing murmur so distinct and close to the ear, as to preclude the idea of a fallacy from the movement of a piston or any other cause: I find the sound to vary in intensity according to the velocity with which the fluid is propelled, to be increased by bending the tube at an angle, and to be still further increased, but also modified, by the admission of air; becoming of a rattling nature, totally different from any sound heard in the heart or arteries. What experiment proves, the principles of hydraulics would lead us to anticipate. It is a fact, established by the investigations of Newton, De Buat, Bernoulli d'Alembert, Robison, Venturi, Dr Young, and others, that the progress of fluid through pipes is retarded by friction against their interior: and that the retardation is increased by all projections, irregularities, and sudden bends; for the fluid, striking against these, forms reverberations and eddies, which impede its current as effectually as solid obstacles. The friction increases with the increase of velocity, and, beyond a certain point, it increases in a much more than simple ratio. Thus, if a steam engine of ten horse power will propel a vessel ten miles an hour, one of a hundred would not suffice to propel it twenty. Now the friction,—in other words, the collision of the particles of fluid against the sides of the vessel and against each other, by producing vibrations of a certain rate of rapidity, is the cause of the sound; and these two phenomena, the friction and the murmur, are, consequently, in the direct ratio of each other. Hence it appears that the murmur is produced in strict conformity with the general axiom, that the particles of all bodies, when thrown into sufficient vibration, generate sound.

" 2. It is next to be proved that, when the sounds in the heart and arteries do occur, there is an increase of friction, dependent on a modification of the motion of the blood, to account for them.

" Being engaged with Dr Marshal Hall in a series of experiments on the effects of loss of blood, &c. a subject for the elucidation of which the profession is deeply indebted to that eminently sagacious observer, we took the opportunity of studying the stethoscopic phenomena of the circulation under all the circumstances of collapse, re-action, &c.

" Eight or ten dogs were blooded more or less frequently, from once to ten or twelve times, and at intervals varying from twenty-four to seventy-two hours. The results were, that, on the day following the first or second abstraction of blood to the amount of eight or ten ounces, the systolic sound of the heart, previously loud and clear, became attended with a whizzing or sawing murmur, the impulse increased and became unusually smart or abrupt, and the pulse became quick and jerking, with a thrill and a throbbing, perceptible over the whole body. These phenomena increased up to the fourth or fifth bleeding, when they appeared to attain their maximum, the sawing sound being extremely loud, the impulse and pulse violently jerking and bounding, the arterial thrill or purring tremor excessive, and the throbbing perceptible not only when the finger was placed on an artery, but when the hand grasped a large surface of the body. A hissing bellows-murmur was, moreover, distinctly heard, when the stethoscope was placed over any considerable artery, as the femoral or carotid. The pulse at this time generally beat from 150 to 190 per minute, its natural standard being about 120.

"The phenomena underwent the following changes in correspondence with changes in the circumstances. The animals being extremely nervous and irritable, the pulse was instantly accelerated ten or fifteen beats per minute by the slightest excitement, as that of being moved or startled; and the murmur and jerk sustained, in consequence, a remarkable increase.

"After reiterated venesections the pulse became small and weak; but, so long as it remained jerking (or *sharp*, as some would now designate it) the murmur continued, though not so loud as previously.

"If venesection was omitted for three or four days, reaction subsided; and in proportion as the pulse and impulse became softer, though without a loss of *real* strength and fulness, the murmur, both of the heart and arteries, the purring tremor, the general throbbing, and the nervous irritability, gradually disappeared.

"If, during the full prevalence of all the phenomena, the animal was bled to the approach of syncope, the pulse and beats of the heart, reduced to about 100 per minute, became feeble and soft, and at the same time lost all murmur and thrill; but, in the course of from fifteen to thirty minutes, reaction was re-established and all the symptoms recurred.

"If the animal was held erect by the fore-legs, a posture which, either by diminishing the afflux of blood to the brain, or by obstructing the circulation through the heart and lungs, caused the gradual supervention of syncope, the pulse became slow, soft and feeble, and the murmur and thrill were suspended; but they were promptly restored to their former state when the animal was placed on its legs.

"From these experiments it may be concluded that the murmurs and tremors are dependent on the spasmodic abruptness of the heart's contraction, or, more rigidly speaking, on the velocity with which the blood is propelled in consequence of that abruptness:—a velocity which implies an augmentation of friction, and consequently of arterial vibration. That an increase of velocity alone suffices to excite the phenomena, independent of an increase of *real* force of the heart's contraction, is proved by their existing when the pulse was small and weak, provided it was jerking or sharp. I conceive the primary cause to reside in the heart and not in the arteries, because the action of the latter was always in exact proportion to that of the former. Some exceptions to this, which have been observed in the human subject, I shall presently explain. A collateral circumstance, which may probably favour the production of murmur and tremor, is, the attenuation of the blood; for its particles, having lost a proportion of their lubricity, are better calculated for rapid motion, and consequently for the production of murmur and vibration by the collision against each other and against the walls of the containing vessel. This attenuation (the existence of which was strikingly displayed in some of the above experiments by the crassamentum being reduced to a very small fraction,—one-sixth to one-twelfth for instance, of the serum,) is not confined to cases of excessive loss of blood, but exists also in a large proportion of the nervous cases which present bellows-murmur. We now come to the third branch of the subject; namely, to prove—

" 3. That the explanation applies equally, whatever be the circumstances under which the sounds occur. In order to substantiate this point, it is merely necessary to show that, where the sounds do occur, they are attended, to a greater or less degree, with a jerking action of the heart and arteries analogous to that which has been described. Pericarditis and adhesion of the pericardium, affections remarkable for a bellows-murmur hitherto not satisfactorily explained, will, in their proper articles, be proved to fall under these conditions.

" Another class in which the bellows-murmur prevails, consists of those who are under the influence of reaction from excessive loss of blood, whether by the lancet or by hæmorrhage. The jerk and throb of the pulse, even when small and compressible, is well known to all who have witnessed a case of uterine hæmorrhage. In cases of active hæmorrhage, as hemoptysis and even epistaxis, I have known the throb to supervene sooner than could be accounted for by the quantity of blood lost. In these cases it appears to be attributable either to the same plethoric habit and irritable temperament which predisposed to the hæmorrhage, or to the fright which seldom fails to be occasioned by the unexpected appearance of blood.

" The remaining and by far the largest class of individuals in whom the bellows-murmur is apt to occur, consists of young people of plethoric habit and delicate, irritable temperament, subject to hysterical and hypochondriacal affections, and to nervous palpitation. In such, the murmur may come on whenever the circulation is excited, and, for exciting it, the most trivial causes are sufficient. I have seen a single cough, or a full inspiration, or a little flatulence, produce the effect for a few beats only; while the act of turning in bed, of rising suddenly, of being startled by any noise, has occasioned it for several minutes. An emotion of grief or pleasure will sometimes produce a more considerable and permanent effect. I have often been assured by patients that the momentary flash of an idea across the mind, has sufficed instantly to excite a violent fit of palpitation, and that this has recurred several times a day, whenever the same idea has presented itself. That, under so irritable a state of the nervous system, the heart should contract with spasmodic abruptness, might be anticipated. What theory points out, experience proves; for the sharp, jerking pulse and beat of the heart of a patient in a state of nervous agitation, is too well known to require demonstration. Sometimes, when the nervous excitement is excessive, a violent throbbing is perceptible over the whole body, and the bellows-murmur and thrill are distinct in every considerable arterial trunk. When such is the case, the anxiety and distress of the patient are extreme, and his situation is not exempt from danger. Though death is rare when the symptoms are purely nervous, I have once seen it occur. The patient, a healthy plethoric young female, who became affected on the intelligence that her husband had deserted her, lay twenty-four hours in a state of almost complete insensibility, and the violently bounding, jerking and thrilling arterial throb, together with universal flushing, heat and perspiration of the surface, resisted every remedy, and only subsided with the wane of life."—Pp. 69—78.

The general inference drawn shortly after is deserving of particular attention, and cannot be too strongly or too frequently impressed.

" It may be remarked, in conclusion, that the purely inflammatory pulse, though more or less quick, full, strong, and hard, is not jerking nor attended with bellows-murmur. These distinctions, which, to the inexperienced, may appear refined in description, are perfectly familiar to practical men ; and it is of great importance to the young practitioner that he make himself intimately acquainted with them, as such knowledge will not only facilitate his diagnosis, but prevent the unnecessary and often, in nervous cases, pernicious abstraction of blood for imaginary fever or inflammation.

" After having studied all the phenomena, both physiological and pathological, of the heart's action, an ulterior question naturally presents itself—what is the first principle,—the primary spring, which gives motion to the great organ of the circulation. As this is rather a question of physiological interest, than one, the determination of which is essential to the present subject, I shall merely glance at the existing opinions, and leave the reader to prosecute the inquiry by referring to original sources of information."—Pp. 79, 80.

These explanations of the healthy actions of the heart are followed, in the second division of the work, by their application to illustrate the modifications which they undergo in consequence of disease. It is divided into two parts,—one devoted to the consideration of the inflammatory affections, *pericarditis*, *carditis*, and inflammation of the arterial textures; the other to the organic diseases, comprehending hypertrophy, dilatation, softening, induration, adipose conversion, accidental productions, atrophy, and finally, the complicated subject of disease of the valves.

Into the detailed consideration of the mode in which Dr Hope treats of these several subjects, our limits will not allow us to enter in the manner they deserve; and we have further had occasion, when speaking of the works of Laennec, Andral, and others, to tread so much of the same ground, that this is almost superfluous. We must, therefore, confine ourselves chiefly to the selection of such topics as, from their general interest, the peculiar manner in which the author treats them, or the smaller proportion of attention formerly bestowed on them, may seem most to demand consideration.

The observations on ossification and other degenerations of the arterial tunics are the first meriting particular attention. These changes, the history and progress of which Dr Hope has evidently studied with attention, he is inclined to attribute principally and generally to the influence of chronic inflammation; *first*, because in other textures we find this process frequently terminating in these morbid changes, especially ossification; *secondly*, because, whatever be the nature of the process, it is generally associated with a plethoric state of the vascular system; and, *thirdly*, because it is a latent action, and not accompanied or followed by those manifest signs and effects which indicate acute inflammation. He further admits that there may be and are instances in which we cannot recognize chronic inflammation, and which, nevertheless, are attended with marks of depraved action in the arteries.

When the presence of the disease is established, a task by no means easily accomplished, the physician has not in general reason to apprehend serious or sudden injury to life or its functions. By itself, indeed, the disease is rarely dangerous; but may become so by combination with other morbid states of the vascular system, in which the circulation becomes tumultuous, embarrassed, or obstructed, and hence the prognosis must be regulated by the mildness or intensity of the collateral and accessory maladies.

In his view of the various forms of hypertrophy, Dr Hope, following with a slight modification the distinctions established by Bertin, recognizes three forms of that change;—*simple hypertrophy*, in which, with thickening of the cardiac walls, the cavity remains unaltered; *hypertrophy with dilatation*, the *excentric* or *aneurismal hypertrophy* of Bertin, in which, with dilatation of the cavity, the walls may be either unchanged or thickened; and *hypertrophy with contraction*, the *concentric hypertrophy* of Bertin, in which the two characters of thickening of the walls and diminution of the cavity are united.

It is of moment, with regard to the distinguishing characters of these forms of hypertrophy, to remark, that, while in the first case the hypertrophic augmentation takes place chiefly at the exterior surface of the organ, and in the third, it takes place at the inner surface; in the second form, however, it consists in different degrees of an interstitial deposit in the substance to compensate and counteract the tendency to extenuation of the walls by the distending forces.

Hypertrophy may be confined to one chamber or division of the heart, or it may affect the whole organ. The ventricles, however, are more frequently hypertrophied than the auricles, because they are most exposed to the exciting causes, and because the auricles are in some degree protected by means of the auriculo-ventricular valves.

When all the chambers are affected and dilated at the same time, the heart attains twice, thrice, or four times its natural bulk; it acquires a spherical shape, by its apex becoming obtuse and rounded; and it assumes an unnatural horizontal position, by encroaching so far on the left cavity of the chest as to thrust the lung upwards to the level of the fourth rib or even higher. Dr Hope has further seen it cause a singular bulging of the precordial region in so many cases, that he is disposed to regard this as a general fact.

The left ventricle is more liable to hypertrophic enlargement than the right; and it sometimes acquires such a size as to cause the organ to occupy not only the left precordial region, but to extend beneath the *sternum*, where its impulse and sound may be mistaken for that of the right. The walls of the chamber may then be augmented, from their average thickness of half an inch to one inch, one inch and a half, or even, according to some observers, to two inches. In general, however, it does not exceed one inch and a quarter; and the site of the greatest thickening is usually a little above the middle of the ventricle, near the attachment or origin of the *columnæ carneæ*, and from which the thickness diminishes gradually. These columns of muscular structure in general partake in the disease; but it depends on particular circumstances, whether they shall be enlarged, thickened, and indurated, or extenuated, flattened, and stretched. The *septum* is usually less thickened than the left ventricle, to which it properly belongs. When the left ventricle alone is enlarged, it protrudes downwards, forwards, and laterally beyond the right, which is flattened and small beside it; but when the right is elongated, it bulges out beyond the left. When the right ventricle alone is hypertrophied, it projects below the left, and forms the *apex* of the organ. Its muscular *columnæ*, which are more numerous and complicated than those of the left, and more susceptible of thickening than the walls of the chamber, are often the parts principally or exclusively affected, and with the interlacement and thickening may occupy the entire chamber of the ventricle.

But not only may hypertrophy be confined to a single ventricle or particular parts, but it may be modified in such a manner that, while one part is hypertrophied with dilatation of the chamber, another may be hypertrophied with diminution of the capacity of the chamber. When the auricles are affected, it is the second species, or that with dilatation, in other words, general interstitial hypertrophy. The external and the internal forms of hypertrophic augmentation are, nevertheless, not without example. Though the muscular part is often the only one affected, so as to give the *pectinated muscles* a character of extraordinary developement, the membranous may also be thickened, so that the whole auricular *parietes* are uniformly and generally enlarged and thickened.

The explanation usually given of hypertrophic augmentation, which is, that it is the result of augmented nutrition, in consequence of augmented action, is adopted by Dr Hope. As in consequence of excessive exercise the external voluntary muscles acquire great size, in like manner it is said, the heart may, under the operation of augmented action, be preternaturally augmented in size. " When, from mechanical obstruction, or any other cause," says Dr Hope, " blood is inordinately accumulated in the heart, the organ is provoked to extraordinary efforts; it struggles against the obstacle; it frets and labours to overcome it; the coronary arteries are excited to increased activity; augmented nutrition ensues; the *parietes* are thickened; the muscular power is increased; the effects, superadded to the cause, induce a still greater violence of action; and thus the disease is not only established, but has a constant tendency to increase."

This explanation is certainly highly plausible and natural, considering the principle with which it sets out. But we must say, that we have been more than once inclined to doubt, whether the principle of augmented growth, in consequence of augmented action, is strictly and justly applicable to the case of hypertrophy of the heart, or others of the organic muscles. In the case of exercise and frequently great, but regular efforts, the augmentation in size is not only not morbid, but it is in the highest degree healthy and natural, unless the action be carried to such intensity as to rupture, lacerate, or contuse the constituent fibres of the muscles exercised. In the case of exercise of the voluntary muscles also, it is understood that the effort is made with a certain degree of competency in the muscles, and that it is never so great that they are not within reasonable limits adequate to the efforts made. The moment the effort or efforts attain this excess, the contraction of the muscles is necessarily inefficient, and instead of increase of strength, diminution is the result, either from dynamic or organic injury.

It is to be further remarked, that this increased action, though attended with great increase of muscular strength, is by no means attended with proportional increase of size. The muscles of the brawny blacksmith, or the sinewy fencer, are not so much distinguished for size as energy of action, and strong developement of figure; and every one accustomed to survey muscular figures must have often remarked, that in many instances they are not larger, and in some are smaller, than the muscles of those who lead inactive lives. They are indeed infinitely firmer, and beyond comparison more energetic; but as to size, no one would venture to speak of them. Let us look even at the same animals in a state of constant muscular exertion, or in the opposite condition, of sloth or inactivity. The muscles of the wild duck, which is constantly on the wing, are redder, firmer, and infinitely more powerful than those of the tame domestic waddler. But as to size, we believe little difference can be recognized; and the increase is rather, we believe, on the side of the latter. In short, we think it by no means an established principle, that increased action is invariably followed by increased size; and though the usual effect is to augment strength and firmness, and to give a deeper colour to the fibre,—if the magnitude remains not the same, it is not augmented.

In the case of augmented action of the heart, on the contrary, the whole of this order is inverted. The efforts made by the organ to expel the accumulated blood, and to relieve itself of a load preternaturally great, are, according to the hypothesis, quite inadequate and inefficient; and by this inadequacy every previous contraction renders a succeeding one necessary, every one of which is not less inefficient than the preceding. This does not seem, according to what is observed of healthy muscular action, a very rational mode either of augmenting strength or increasing size. Nor can it be said to be the uniform effect of obstruction to induce hypertrophy; for it is as often the cause of mere dilatation, and occasionally of attenuation. Even the very circumstance of partial augmentations of thickness of the walls of the heart, may be regarded as convincing proof that the mere necessity of overcoming an obstacle is not the uniform cause of hypertrophy, and would seem rather to lead to the conclusion, that the increased action was the effect of the hypertrophy, and that the latter was the result of some more general cause. This, indeed, we acknowledge our inability to explain. But this does not prevent us from recognizing and pointing out several circumstances which we regard as difficulties, and therefore inadmissible in the present mode of explaining the origin of hypertrophy.

Regarding the general principle, nevertheless, as correct, that hollow muscles resist overdistension by their contents with a force exactly proportionate to their strength, Dr Hope applies it to explain the fact, that the left ventricle is more prone to hypertrophy than the right, and the right than the auricles; since the former, having to propel the whole load of the circulation, is, therefore, proportionally substantial and robust; while the right ventricle, to which is assigned the function of urging blood through the pulmonary ramifications, is thinner and less powerful, and the auricles, which have still less laborious duty, are still less muscular than either. Now, however plausible this appears, is it not reasonable to think, that the power which, according to the hypothesis, is adequate to healthy action, ought on the same principle to be adequate to resist the inroads of disease? The contrary admission implies, that these several parts are strong exactly in the inverse ratio, and are imperfect exactly where they ought to be complete; in other words, the auricles are the most perfect for their purpose, the right ventricle less so, and the left least of all. We must say that this doctrine, which involves that of final causes or ultimate purposes, betrays marks of weakness which we should like to see removed. We are not so unreasonable as to lay this to the charge of the present author. It is, we believe, a doctrine common to most of those who have lately written on the subject of diseased heart; and the objections which we now state apply with equal force to all their reasonings.

In the same manner, when he comes to consider the causes of hypertrophy, Dr Hope reasons as to the mode in which they operate, with certain modifications, however, according to the site of the obstruction, and the manner in which it produces the preternatural efforts. Thus, while he sets out with the principle, which to a certain extent is an undoubted fact, that impediments in the aorta, the aortic orifice, or the arterial system, act primarily on the left ventricle, which is enlarged and thickened, while the auricle, protected by its valve, is unaffected, —he adds, that the latter enjoys this immunity, only so long as the ventricle, thickened as it is, is capable of propelling its contents. If, however, the ventricle, after being long over-distended, ceases to expel its contents completely, the auricle is thereby prevented from emptying itself, and becomes distended in proportion to the duration and the degree of this force. Dr Hope even infers that this obstruction may be propagated from the left auricle by the pulmonary vessels to the right side of the heart,—a circumstance which is certainly not impossible, but which can take place only in cases of long continuance.

> "When the mitral orifice is contracted," says Dr Hope, "especially if the aperture be very small, the left ventricle, being insufficiently supplied with blood, is not stimulated to its ordinary contractile action, and consequently becomes emaciated and occasionally flaccid or softened. Meanwhile, the left auricle, having to

struggle against the contracted valve in front, and also to sustain the distending pressure of the blood flowing in from the lungs, invariably becomes thickened and dilated. The engorgement, extending backwards through the lungs to the right ventricle, occasions its hypertrophy and dilatation; under which circumstances, namely, hypertrophy of the right ventricle and contraction of the mitral valve, the lungs suffer in a pre-eminent degree: for, being exposed to the augmented impulsive power of the right ventricle behind, and incapable of unloading themselves on account of the straitened orifice in front, their delicate and ill-supported vessels are strained beyond the power of resistance. If, therefore, they cannot disgorge themselves sufficiently by a copious secretion of watery mucus, they effuse blood by transudation into the air-vesicles and tubes, and form the disease denominated *pulmonary apoplexy.* I have found this affection to occur more frequently under the circumstances described, than under any other.

"When the mitral orifice is permanently patescent, so that, at each ventricular contraction, blood regurgitates into the auricle, this cavity suffers in a remarkable degree: for it is not only gorged with the blood which it cannot transmit, but, in addition, sustains the pressure of the ventricular contraction. Permanent patescence of the mitral orifice, therefore, constitutes an obstruction on the left side of the heart, and the effect of this, as of contraction of the orifice, may be propagated backwards to the right side."—Pp. 197, 198.

He finally concludes with the following list of the different forms and combinations of hypertrophy and dilatation, arranged in the order of their comparative frequency of occurrence: 1. Hypertrophy with dilatation of the left ventricle, and a smaller degree of the same in the right; 2. Hypertrophy with dilatation of one ventricle, especially the left, with simple dilatation of the other; 3. Simple dilatation of both ventricles; 4. Simple hypertrophy of both ventricles; 5. Simple hypertrophy of the left, and hypertrophy with dilatation of the right; 6. Dilatation with attenuation of the left; 7. Hypertrophy with contraction of the left; and 8. Hypertrophy with contraction of the right. In the auricles the succession is,—Distension, particularly of the right, from congestion during the period of dissolution; 2. Dilatation with hypertrophy; 3. Simple hypertrophy; and 4. Hypertrophy with contraction.

The account of the *pathological effects of hypertrophy, and the mode of their production*, in the fourth section, is void of the objections stated above, and is in every respect, but more especially as it bears evident marks of being the result of careful and elaborate personal observation, is particularly deserving of attention. The subject is complex, and by no means free from difficulty; but Dr Hope has placed all the circumstances, primary and secondary, as well as their reciprocal influence, and their modifying operation, in a light so clear, and in order so perspicuous, that the reader who understands the theory of the circulation can experience no difficulty in following the train of inferences. He follows Laennec in showing that pure hypertrophy gives rise to increased force and activity of circulation, which, when it exceeds the natural tonic power of the capillaries, induces congestion, infiltration, and the other phenomena of obstructed motion of the blood. The department of the vascular system, however, in which these effects are most pre-eminently displayed, when the left ventricle is hypertrophied, is that of the brain, in which the preternatural impulse is very prone to induce the state causing palsy, or even apoplexy suddenly fatal; and if in some individuals particular local or constitutional circumstances counteract this result, headach or even brain fever, or in slighter and more limited degrees of vascular disorder, ophthalmy and atrophy of the globe may be the result. In the same manner hypertrophy of the right ventricle, by the impetuosity of its impulse along the pulmonary artery, is liable to produce pulmonary apoplexy, or hemorrhage of the lungs, active, violent, and impetuous.

In treating of the semiography of the disease, Dr Hope restores to its place among the rational signs, that of *jugular venous pulsation*, or *turgescence of the jugular veins, with pulsation synchronous with that of the arteries*, originally specified by Lancisi, but rejected on insufficient grounds by Corvisart. He does not admit the adequacy, however, of the explanation of this phenomenon suggested by Bertin, who ascribes it to regurgitation, in consequence of incomplete closure of the auriculo-ventricular orifice by its valve. He suggests, on the other hand, that, as the tricuspid valve recoils with augmented impetuosity, the column of blood descending into the ventricle may be repelled with so much force as to propagate its impulse to the jugular veins. The double beat of the jugular pulsation he ascribes to auricular *systole*, succeeding the ventricular, which has been incapable of unloading that chamber. Among the physical signs, he remarks the impulse or *visible* pulsation of Dr Corrigan, which is slow, heaving, and progressive, and followed by sudden sinking, which Dr Hope distinguishes by the name of the *back stroke*, and which he ascribes to *diastole* of the ventricles. *Simple hypertrophy*, he remarks, is chiefly distinguished by the strong, slowly heaving impulse; *hypertrophy with dilatation* by this with back stroke, and visible pulsation of the carotids, radials, and other superficial arteries; and *hypertrophy with contraction* by slighter impulse, and inconsiderable back stoke, or the absence of that predominant symptom.

In *hypertrophy with dilatation*, the impulse is inconsiderable; but in febrile or excited states of the system, it becomes violent, and is manifested by strong hard circumscribed beats, analogous to the blows of a hammer. In *simple hypertrophy*, the first sound, that of the ventricular contraction, is duller and more protracted than natural, in proportion as the hypertrophy is more considerable; and it generally terminates without interval in the second, and in extreme cases it is nearly or wholly extinct. The second sound, that of the ventricular *diastole*, is short and dull, sometimes imperceptible. When the pulsative area is limited, it indicates that both ventricles are affected; but if it be diffused in points, one only is in all probability hypertrophied. In *hypertrophy with dilatation*, the sounds are augmented in intensity.

Hypertrophy does not necessarily abridge the duration of human life; and in many cases it appears that it may exist in a considerable degree without producing much inconvenience or seriously deranging the health. It is only when it is aggravated by intemperance and excess, the pleasures of the table, or by occupations requiring great muscular efforts, or when the individual is liable to gusts of passion or violent mental emotion, that it becomes dangerous, and is then liable to induce apoplexy, palsy, or *hemoptysis*, or some of those disorders in the capillary circulation and secretion, which end in incurable hydrothorax or general dropsy.

In considering the treatment best suited to this form of heart disease, Dr Hope disapproves of the method of Albertini and Valsalva, as modified by Laennec, on the ground that the frequent detractions of blood, though affording temporary relief, are always followed by so much and violent reaction, as, instead of abating, to aggravate the disease, while they remarkably impair the general strength of the patient. On this account, he proposes, with the view of diminishing the quantity without vitiating the quality of the blood, to abstract only four, six, or eight ounces of blood every two, three, four, or five weeks, according to the strength of the patient, and its effects on the palpitation, dyspnœa, and violent cardiac impulse; and to detract it by cupping from the nape of the neck, if the head is much affected. At the same time, he proposes to restrict the patient to white animal food, in small quantity, in the plainest and least stimulating form, a sparing allowance of liquids, without spirituous or fermented liquors, and to confine him to the gentlest and least exciting exercise, with the use of such medicines only as tend to keep the action of the bowels quite regular, and those which maintain the action of the kidneys, which he contends are beneficial not only in confirmed dropsy, but when the breathing is oppressed, and the capillary circulation presents symptoms of being overloaded.

Of the three forms of *Dilatation*, that with *thickening* of the cardiac walls, that in which they are *unchanged*, and that in which they are *attenuated*, the latter only claims particular attention. The extenuation which, though more common in the right than the left, may affect both ventricles, may proceed to such an extreme as to reduce the most substantial part of the left ventricle to two lines in thickness, and the *apex* to the character of a thin membrane. The *columnæ carneæ* are stretched and expanded; and while the *septum* is less attenuated in proportion than the other parts, dilatation takes place more in the transverse than in the longitudinal direction, and the heart acquires a spherical shape, so that its diameter near the *apex* differs little from that at the base, while the *apex* itself is rounded and almost obliterated. It is natural to imagine that such a degree of extenuation of the cardiac *parietes* may terminate in laceration; and though this had not actually occurred to Laennec, it has been seen by Dr Hope, who found in the heart of a man of 70, who expired instantaneously on the night-chair, a fissure in the left ventricle an inch long, with violet-coloured softening of the neighbouring texture, and the interior of the pericardium filled with blood. A similar case, but accompanied with softening, a very natural attendant on such a change, occurred to Dr Williams in the person of a lady of 58. This dilated state of the heart, Dr Hope distinguishes from mere distension, an effect of the dying agonies, by flaccidity, want of tension, and the continuance of the enlargement after the removal of the blood.

The causes of dilatation are in general the same as those of hypertrophy; and the occurrence of the dilated and extenuated state of the *parietes* seems to depend on individual peculiarities connected with the original formation of the organ.

The opinion of M. Bertin, that dilatation is a secondary phenomenon, or an effect of several other primary maladies, Dr Hope endeavours to show, by various facts and arguments, to be fallacious. Dr Hope also contends, that M. Bertin is wrong in ascribing the complaints found in persons affected with dilatation to the alleged primary disease; because he has often seen instances of contracted valve, or aneurism of the aorta, unconnected with dilatation, subsist for a long time without causing uneasiness,—whereas, the moment dilatation began to take place, all the usual symptoms of disordered heart and impeded circulation made their appearance, often in an aggravated form. The accuracy of this observation, as a matter of fact, cannot, we believe, be questioned; but a different mode of explanation may be given, without coming in all cases to the inference, that the dilatation alone is the cause of all the peculiar symptoms which the patient presents. No fact is better established, than that certain degrees of disease of the valves, or aortic aperture, or arch, may take place without producing very marked uneasiness. When these, however, proceed to a certain extent, very difficult we admit to specify, they produce almost at once, or, at least, in certain states of the system, in an incredibly short space of time, all the usual effects of impeded circulation, and labouring and inefficient action of the heart, and, by their continuance, give rise to that enlargement of the cardiac chambers, and extenuation of their walls, which necessarily results from continued over-distention. An attack of fever, or ordinary catarrh, with much cough, a debauch, a sudden and violent mental emotion, or a deep and settled fit of melancholy, resulting from some unexpected adverse event, may in many cases be recognized as the first circumstance which gave the accelerated force and augmented momentum to an action only in its incipient stage. In other respects, we believe that the distinction between dilatation as a primary and as a secondary effect is not so great as Dr Hope seems to imagine. We must admit, nevertheless, that the fact which he states, of having witnessed *numerous instances* in which all the phenomena of obstructed circulation were occasioned by dilatation alone, must be regarded as strong proof of the justice of the opinion, that it must be occasionally regarded as a primary affection. In the meantime, we conceive pathological inquirers ought not to regard the question as decided; for though in the cases alluded to no adequate obstacle could be recognized, others may occur in which very new and unexpected causes of impeded circulation may be detected. On this subject, indeed, the observations of Dr Hope display much ingenuity, and should be carefully studied by all those who wish to understand thoroughly the influence of different morbid states of the heart or its valves in inducing disordered or impeded circulation. The observations in the subsequent section, on the effects produced by this on the cellular tissue, the vessels of the brain, those of the mucous membranes, and of the liver, are particularly interesting; and the account of the physical and stethoscopic signs is given with great regard to precision. After remarking the insufficiency of the progressive scale of Laennec in ascertaining the presence and degree of attenuation, Dr Hope gives the following account of his own method of proceeding, which we think is well calculated to attain the object in view.

"My own mode of estimating the degree of dilatation is, by observing how far the first sound resembles the second, and comparing the intensity of the first, heard immediately over the ventricle affected, with what I conceive from experience would be its intensity in the same subject if the heart were healthy. I then corroborate the estimate, if necessary, by the scale of Laennec; making allowance, as far as is practicable, for stoutness, leanness, youth, pulmonary condensation, &c.

"The manner in which I judge of attenuation by the first sound, is less by its loudness, than by its greater shortness and clearness; for I think it is often louder in dilatation with hypertrophy or even with a natural thickness of the parietes, than with attenuation. This opinion is opposed to that of Laennec, who 'thinks he may regard it as constant that the extent over which the beats of the heart are audible is in the direct ratio of the feebleness and thinness of its walls.' So far is this from being perfectly true, that I have met with cases in which the heart was dilated and attenuated to the extreme, yet the first sound was feeble. Nor should we expect it to be otherwise in such cases; for when the heart, from extreme dilatation, is too feeble to contract smartly, its sounds must necessarily be weak. Hence they are so in ramollissement, and in the moments preceding dissolution."—Pp. 275, 276.

In the management of persons labouring under this disease, Dr Hope recommends nutritious, but not stimulating food, in small bulk, and at short intervals; residence in clear, dry, bracing air, such as that of Brighton; and the use of the shower-bath, unless where there is pulmonary congestion, with copious expectoration, when a warm humid atmosphere is said to answer better. Preserving the tone and healthy action of the stomach by tonics and bitters, and maintaining the cutaneous circulation and secretion by the use of flannel, are recommended; but blood-letting is proscribed as in all instances injurious, unless where there is dyspnœa, that is, constant difficulty of breathing, when it should not exceed six ounces, and should be drawn in the recumbent posture.

Softening of the heart, when accompanied with increased redness, Dr Hope agrees with Bouillaud in regarding as the effect of acute inflammation; and the same change, when of a pale or yellowish colour, he follows Laennec in considering as a result of lesion of nutrition;—thus reconciling in a rational manner two very opposite opinions. There is some difficulty in recognizing its presence, as it is generally complicated with some other cardial or pericardial disorder. The treatment must be regulated by the cause on which it depends; if inflammatory, by antiphlogistics, and if cachectic or asthenic, by tonics.

Induration, adipose conversion, adventitious structures, and atrophy, which are more important pathologically than practically, may be omitted.

The ninth chapter, on the diseases of the valves, is extremely instructive, and exhibits a full and complete history, pathological, semiotic, and therapeutic, of these affections, so manifold in form and number, yet so similar in effects. Of this we would willingly give a sketch, were we satisfied that this could convey any adequate idea of its contents. But we would rather recommend our readers to peruse it with attention, and compare it with cases in clinical practice, and specimens in pathological cabinets; and we are convinced they will find Dr Hope's work a safe and trustworthy guide. This character, indeed, ought not to be restricted to this part only of the work, which, in every department of the subject of diseased heart, contains much valuable information. The author has cultivated with indefatigable diligence, and no ordinary judgment, the field originally laid open by Burns and Corvisart, and since cultivated with success by Laennec, Bertin, and Andral; and when we say that he has either extended or rectified the views of these authors, it implies no ordinary degree of merit. In conclusion, the treatise of Dr Hope is at present the best in the English language on the subject of diseases of the organs of circulation.

ART. II.—*The Anatomy of the Brain, with some Observations on its Functions.* By ALEXANDER MONRO, M. D. F. R. S. E. Professor of Anatomy and Surgery in the University of Edinburgh. *To which is prefixed, an Account of Experiments on the Weight and Relative Proportions of the Brain, Cerebellum, and Tuber Annulare, in Man and Animals, under the various circumstances of Age, Sex, Country, &c.* By SIR WILLIAM HAMILTON, Baronet. Illustrated by Coloured Engravings. Edinburgh, 1831. 8vo. Pp. 62.

THOUGH the description of the brain given in the present short treatise contains nothing new, it gives a clear, and in general correct, account of the anatomical peculiarities of the organ. Several statements, indeed, we observe in which we cannot quite agree with the author; but, as we always presume that Dr Monro states what he conscientiously believes to be the result of accurate personal observation, whatever remarks we have at present to offer, will, we trust, be regarded as equally entitled to that character; and these we propose to confine chiefly to points on which we conceive some rectification is required.

Dr Monro justly represents the parts of the brain to be double. In mentioning its character as a symmetrical organ, however, he maintains, on the contrary, that, " if the brain be examined with great care, it will be found that, except in general correspondence in form and appearance, the opposite halves are neither exactly similar as to size nor as to shape,—an observation which applies not only to the surface, but also to the internal parts of the brain. Thus, we sometimes observe," continues Dr Monro, "the hemispheres of unequal size, and the convolutions of one side of the brain much more prominent than those of the opposite side. There is also sometimes a most marked difference as to the size of the *thalami* or *colliculi nervorum opticorum*, and of the *corpora striata* of the lateral ventricles."

On this statement we must observe, that, though part of it is well-founded, the accuracy of another part is highly questionable. It is indeed true that the external or convoluted surface of the brain is in its convolutions void of symmetry, or does not consist of similar halves; and even one hemisphere may be often observed in figure and size to be visibly different,—larger or smaller, more or less prominent than the other. It is, however, different with the central, interior, or figurate surface of the brain, the parts of which are quite as symmetrical in the majority of subjects, as other parts of the animal body usually admitted to be symmetrical. To entitle parts to the character of symmetrical, it is not requisite that they should agree in figure, in breadth, in length, and convexity, to the fiftieth part of an inch; for no part of the symmetrical organs of the human or animal body admits of this nice and accurate test. In the same skeleton is the right *femur* or *tibia* ever exactly or mathematically similar to those on the left side? and would not strict examination of the processes, depressions, lines, and ridges, discover remarkable differences? Are the ribs or the pelvic bones of the right side ever geometrically similar to those of the left? In these bones, however, the anatomist, and even the ordinary observer, recognizes a general correspondence or analogy in figure, and direction,—in the number, size, and shape of their processes and depressions,—in the number and character of their lines and ridges, and in the disposition of their articular surfaces,—which is sufficiently distinct and characteristic to entitle them to the character of symmetrical parts.

In the same manner, a general resemblance in figure, size, and convexity, and even length and breadth between the right and left optic *colliculus*, and between the right and left *corpus striatum*, manifestly thrusts itself on every observer, and obliges him at once to allow that the one corresponds with the other in all essential characters. It is of little avail in this instance to say that the right is half a line longer or broader than the left, or that the latter is more convex than the former. Measurements so precise are required neither for anatomical accuracy, nor physiological or pathological precision. Numberless circumstances may produce slight variations in this similarity, exactly as few persons have one side of the head exactly of the same figure or convexity as the other, few have the left shoulder so prominent as the right, and few the left arm so large as the right, and few have the nose geometrically in the middle of the face. To these members, notwithstanding, no anatomist ever denies the property of *symmetry* as usually understood. In the brain even after death, parts may vary in size and figure from the pressure of one on the other, and other causes operating after death. While, therefore, we do not deny that the professor may be accurate in remarking a difference in size in the *thalami* or *corpora striata*, we cannot agree with him in thinking that this difference is adequate to exclude the central surface of the brain from the class of symmetrical organs. We must be allowed even to remark, that in all instances in which we have examined the healthy brain in the recent dead subject, we have been particularly struck with the exact symmetry and correspondence of the *corpus striatum* and optic *thalamus* of the right side with those of the left,—a correspondence also so perfect that we have nowhere seen it represented accurately and naturally in engravings. It is on this topic important to remark, that the smaller the parts are, the more exactly do those on opposite sides of the mesial plane resemble each other in figure, size, and other properties. The two *corpora quadrigemina* of the right side are as accurately as possible of the same size, as to length, breadth, elevation, and convexity, as those on the left side; the two *pedes hippocampi* very nearly correspondent; and the two *corpora albicantia* as exactly matched as visible inspection can demonstrate. Since small parts are less acted on by gravitation and the relative position of others, this may be regarded as satisfactory evidence, that, excluding causes which operate either morbidly, anomalously, or after death, these parts are originally and naturally symmetrical.

On the distinction of the inferior surface of the brain into three lobes, retained by Dr Monro, we have merely to observe, that it may be convenient in relation to the containing and contiguous parts; but it is founded on no natural arrangement of the parts of the organ.

The statement of Spurzheim noticed by the author, that "the fibres may be traced from the *corpora pyramidalia* to the *tuber*, and thence to the *crura* of the brain, *corpora striata*, and substance of the hemispheres," is to be understood to be accurate or inaccurate only according to the mode in which the organ is dissected. There is no doubt that the fibrous structure of the pyramidal bodies may be observed to be in continuation with that of the protuberance; and it is equally certain that these same fibres may be observed to be in continuation with those of the *crura* of the brain, and the radiated arrangement of fibres constituting equally the optic *thalami* and the *corpora striata;* and this arrangement, the merit of which has been claimed with such singular arrogance by Gall and Spurzheim, it is equally certain, was recognized partly by Varolius, and more completely by Vieussens, who, in his *Neurographia Universalis*, published in 1684, represented it in several coarse, but on the whole, expressive, and not inaccurate figures. The subsequent investigation of this arrangement by Reil, before either Gall and Spurzheim had thought of it, is well known to the anatomical world; and though many may agree with Dr Monro in thinking that the arrangement, when viewed by the naked eye, is not so regular as represented by the assiduous professor of Halle, much of this must be ascribed to the indifference of anatomists, who are certainly deterred from verifying his observations by the extreme difficulty of the inquiry. Under such circumstances, it is much to be desired that the Professor of Anatomy in the University of Edinburgh should attempt to determine, by personal research and inspection, the extent to which the descriptions and delineations of Reil correspond with nature. We are aware of the arguments usually adduced on these occasions. The inquiry, it may be said, is of no practical importance; and though the descriptions were verified, it is impossible to see in what manner they can benefit medicine or surgery. Nothing can be more stale and unprofitable than this mode of reasoning. The accurate knowledge of the true disposition of these fibrous parts may illustrate much the functions of the brain; and whether this were certain or not, it is impolitic to neglect inquiries, solely because they promise no immediate application.

The statement, that "the *fornix* is the continuation of the *corpus callosum* and *septum lucidum*," is correct in one sense, but erroneous in another. If the eye of the dissector follow the *corpus callosum* immediately downward, or if, according to the gross and somewhat absurd fancy, he imagine that the *corpus callosum* is bent downwards and forwards on itself at its posterior end,—then the *fornix* is the continuation of that and the *septum*. It would be more accurate, however, to represent the *fornix* as merely continuous with these bodies; and it would be more accurate still to represent the *fornix* as the inferior surface of the part named the *corpus callosum* behind; while before, by reason of its being incurvated downwards by its recession from the former body, there is left a triangular space, in which is situate the thin lamellar partition denominated the *septum*.

Few parts of the brain are more inadequately and erroneously described than the *fornix;* and of no subject has the student greater difficulty in forming a clear idea than the relative position of that with the *corpus callosum* and *septum*; yet if this true and simple statement were well impressed and clearly demonstrated, the difficulty would at once vanish. The *fornix*, or vault, is indeed merely the inferior surface of the very identical portion of brain, to the upper surface of which the name of *corpus callosum* is applied. About half way, it is true, between the anterior and posterior ends of this body, the *fornix* begins to be incurvated downwards so as to form an arch longitudinally antero-posterior; and the *septum* is then interposed between the straight line of the *corpus callosum* and the curvature of the *fornix.*

The statement "that the under part of the *fornix* is joined to the *thalamus nervorum opticorum* by a vascular membrane called *tela choroidea*, which cuts off the communication between the lateral ventricles, excepting at an oval aperture situated under the anterior *crura* of the *fornix*," conveys, we conceive, an erroneous idea of the relation between the *fornix* and optic *thalami.* In accurate language, the *fornix* cannot be said to be *joined* to the optic *thalami*, the upper surface of which, as well as the lower surface of the former, is perfectly free, and unadherent, and forms part of the central or figurate surface of the organ. Between the two, indeed, there is extended horizontally a vascular membrane, which is merely the continuation of the *choroid plexus*, from the one ventricle to the other, and the same which is named the *velum interpositum* by Haller. The term *tela choroidea*, is used by Haller as synonymous with that of *plexus choroides;* but from the use made of it by the present author it might be inferred that they are different. Of this membrane the *velum interpositum* forms part, and though it sustains, as the other portions of this web do to the contiguous parts of the brain, the minute vessels of the *fornix* above and the upper surface of the *thalami* below, and in this mode may be said to form a *medium of connection*,—it cannot be said to join them. It is remarkable that Dr Monro gives this view a little farther on in the following terms: "Inferiorly, the *fornix* rests on a thin membrane, the *velum interpositum* of Haller, which stretches across from the choroid *plexus* of one lateral ventricle to that of another;" yet in the description now alluded to, he seems to give one altogether different, and which must lead the student to some confusion. In other respects, except one immediately to be noticed, the description of the *fornix* is accurate.

Is it the fact anatomically, that the anterior *crura* of the *fornix* pass downwards and backwards, and terminate below in the white spheroidal eminences seen on the base of the brain, named

isiform or white bodies, (*corpora albicantia* or *candican-*
By what species of evidence is this determined? We
it is so stated by several authors, especially Santorini, Vicq-
yr, Soemmering, Fyfe, Bichat, Reil, and Meckel, the last
om has given the fullest and most particular account of the
in which, according to Reil, the constituent fibres of the
or pillars descend to the mammillary eminences. Much
s, nevertheless, is hitherto matter of opinion, not demon-
on ; and the fact itself has been repeated by one author after
er in terms too vague and general to merit particular cre-
in strict anatomy.

e result of the arrangement above noticed is, that not only
s point behind the anterior *crura* of the *fornix* do the ven-
s communicate, but all along beneath the inferior surface
at body. In consequence, however, of the space behind
nterior *crura* corresponding exactly with the point at which
ntrum semicirculare geminum, or the gray band separating
rpus striatum from the optic *thalamus* is situate, and the
id plexus passing manifestly from the one to the other side,
fornix is more free at this point, and forms an aperture, not
ly oval as is represented, but rounded above and angular
. Although these facts, which may be easily demonstrated
e dead subject, show indisputably that the lateral ventricles
unicate not merely at this exact point, yet it cannot be ex-
d that the present author should altogether abandon those
of this communication, from which his father derived so
and so well founded celebrity. Although we have no wish
derrate the merit of this discovery, we must be allowed to
hat to represent it to be such as Dr Monro *secundus* has
is to convey a very limited and erroneous idea of the com-
cation. The communication, we repeat, and are ready to
by demonstration, exists not only at the point behind the
ior *crura*, but all along to the posterior end of the *fornix*,
s only concealed from common inspection by the greater or
breadth of the *tænia* of the *fornix*, which is generally
ly expanded from the side of that body over the superior
ce of the optic *thalami* on each side.

the subsequent account of the different parts of the organ,
e happy to observe that the learned Professor has improved
derably, and has given a much more minute account of the
my of the brain than that in the Elements.

the subjects of the structure, consistence, and chemical
rties of the brain, we recognize nothing new. On that,
ver, of the weight and relative size at different ages, and
n and animals, and also on the relative proportions of dif-
t parts, some interesting observations are given by Sir

William Hamilton. As these do not admit of abridgement, and as we know them to be the most accurate and complete yet published, we give them in the words of the Baronet without comment or addition.

" The following, among other conclusions, are founded on an induction drawn from above *sixty human brains*—from nearly *three hundred human skulls*, of determined sex, the capacity of which, by a method I devised, was taken in sand, and the original weight of the brain thus recovered—and from more than *seven hundred brains of different animals.*

" 1. The adult male Encephalos is heavier than the female; the former nearly averging, in the Scots head, 3 lb. 8 oz. troy, the latter 3 lb. 4 oz., the difference 4 oz. In the male, about 1 brain in 7 is found above 4 lb. troy; in the female, hardly 1 in 100.

" 2. In Man, the Encephalos reaches its full size about seven years of age. This was never before proved. It is commonly believed that the brain and the body attain their full development together. The Wenzels rashly generalized from *two* cases the conclusion, that the brain reaches its full size about seven years; as Sœmmering had, in like manner, on a *single* case, erroneously assumed, that it attains its last growth by three. Gall and Spurzheim, on the other hand, assert that the increase of the encephalos is only terminated about forty. This result of my induction is deduced from an average of thirty-six brains and skulls of children, compared with an average of several hundred brains and skulls of adults. It is perhaps superfluous to observe, that it is the greater development of the bones, muscles, and hair, which renders the adult *head* considerably larger than that of the child of seven.

" 3. It is extremely doubtful whether the cranial contents usually diminish in old age. The vulgar opinion that they do, rests on no adequate evidence, and my induction would rather prove the negative.

" 4. The common doctrine, that the African brain, and in particular that of the Negro, is greatly smaller than the European, is false. By a comparison of the capacity of two Caffre skulls, male and female, and of thirteen Negro crania, (six male, five female, and two of doubtful sex,) the encephalos of the African was found not inferior to the average size of the European.

" 5. In man, the cerebellum, in relation to the brain proper, comes to its full proportion in about three years. This anti-phrenological fact is proved by a great induction.

" 6. It is extremely doubtful whether the Cerebellum usually diminishes in old age; probably only in cases of *atrophia senilis.*

" 7. The Cerebellum, in the female, is in general considerably larger, in proportion to the brain proper, than in the male. In the human subject, (the tuber excluded,) the former is nearly as 1 to 7.6; the latter nearly as 1 to 8.4: and this sexual difference appears to be more determinate in man than in most other animals. Almost the whole difference of weight between the male and female encephali lies in the brain proper: the cerebella of the two sexes, absolutely, are nearly equal,—the preponderance rather in favour of the women. This observation is new; and the truth of the phrenological hypothesis implies the reverse. It confirms the theory of the function of the cerebellum noticed in the following paragraph.

"8. The proportion of the Cerebellum to the Brain proper at birth, varies greatly in different animals. Physiologists have hitherto believed, that the cerebella of all animals, indifferently, were, for a certain period subsequent to birth, greatly less, in proportion to the brain proper, than in adults; and have taken no note of the difference in this respect between different classes. Thus completely wrong in regard to the fact, they have wholly overlooked the law by which it is governed. In those animals that have from the first the full power of voluntary motion, and which depend immediately on their own exertions and on their own power of assimilation, for nutriment, the proportion of the cerebellum is as large, nay larger, than in the adult. In the chicken of the common fowl, pheasant, partridge, &c. this is the case; and most remarkably after the first week or ten days, when the yolk (corresponding in a certain sort, to the milk in quadrupeds,) has been absorbed. In the calf, kid, lamb, and probably in the colt, the proportion of the cerebellum at birth is very little less than in the adult. In those birds that do not possess at once the full power of voluntary motion, but which are in a rapid state of growth, the cerebellum, within a few days, at least, after being hatched, and by the time the yolk is absorbed, is as large or larger than in the adult; the pigeon, sparrow, &c. &c. are examples. In the young of those quadrupeds that for some time wholly depend for support on the milk of the mother, as on half-assimilated food, and which have at first feeble powers of regulated motion, the proportion of the cerebellum to the brain proper is at birth very small; but, by the end of the full period of lactation, it has with them, as with other animals, (nor is man properly an exception), reached the full proportion of the adult. This, for example, is seen in the young rabbit, kitten, whelp, &c.: in them the cerebellum is to the brain proper at birth about as 1 to 14; at six and eight weeks old, about as 1 to 6. Pigs, &c., as possessing immediately the power of regulated motion, but wholly dependent on the milk of the mother during at least the first month after birth, exhibit a medium between the two classes. At birth, the proportion is in them (as I recollect) about 1 to 9, in the adult as 1 to 6. This analogy, at which I now only hint, has never been suspected; it points at the new and important conclusion (corroborated by many other facts), that the cerebellum is the intra-cranial organ of the nutritive faculty, that term being taken in its broadest signification, and confirms also an old opinion, recently revived, that it is the condition of voluntary or systematic motion.

"9. Castration has no effect in diminishing the cerebellum, either absolutely, or in relation to the brain proper. The opposite doctrine is an idle fancy; though asserted by the phrenologists as their most incontrovertible fact. Proved by a large induction.

"10. The universal opinion is false, that man, of all, or almost all animals, has the smallest cerebellum in proportion to the brain proper. *Many* of the commonest quadrupeds and birds have a cerebellum, in this relation, proportionally smaller than man.

"11. What has not been observed, the proportion of the Tuber Annulare to the Cerebellum, (and *a majore* to the Brain proper), is greatly less in children than in adults. In a girl of one year, (in my table of human brains), it is as 1 to 16.1; in another of two, as 1 to 14.8; in a boy of three, as 1 to 15.5; and the average of children under seven, exhibits the Pons, in proportion to the cerebellum, much smaller than in the average of adults, in whom it is only as 1 to 8, or 1 to 9.

"12. In specific gravity, contrary to the current doctrine, the encephalos and its parts vary very little, if at all, from one age to another. A child of two and a woman of a hundred years are, in this respect, nearly equal, and the intermediate ages show hardly more than individual differences.

"13. The specific gravity of the brain does not vary in madness—if one case of chronic insanity is to be depended on, contrary to what has been alleged. In fever it often does, and remarkably.

"14. The cerebellum (the converse of the received opinion), has a greater specific gravity than the brain proper; and this difference is considerably more marked in birds than in man and quadrupeds. The opinion also of the ancients is probably true, that the cerebellum is harder than the brain proper.

"15. The human brain does not, as asserted, possess a greater specific gravity than that of other animals." Pp. 4—8.

The injuries which the brain and several of its parts may sustain without seriously affecting the animal or vital functions have of late years attracted particular attention, chiefly with the view of ascertaining the exact influence of individual regions of the organ. Few professional persons have carried these experiments so far as Sir William Hamilton has done. He has thrust wires, pins, needles with threads of various sizes, and other foreign bodies, through the brains of young rabbits, chickens, and dogs, yet without causing to the animals any other painful sensation than those resulting from the puncture of the integuments, and without ultimately interfering with the growth, health, and vigour of the animals. These and similar experiments incontestibly prove a fact which has been long stated in a general mode, that the substance of the brain is itself insensible, and also illustrate another principle, that, namely, which implies the small or rather null influence of the brain on the entrophic or nutritive functions. Though these principles have been admitted by physiologists, it has been commonly thought that the base of the brain, as being intimately connected with the origins of the nerves, could not be injured without serious or even fatal disorder of the functions of sensation, motion, and respiration especially. Sir William Hamilton, however, finds, that, if the large blood-vessels be avoided, and an instrument not too large is used, the inferior surface of the brain as well as its superior, and even the cerebellum, may be penetrated in almost every direction without inducing pain or inflammation or its effects, and, with the exception of a very circumscribed *focus*, without manifest disturbance of the vital functions. As these experiments were performed on the young of the lower animals, the conclusions resulting from them must, in their present state, be limited to this class of categories. Sir William Hamilton, however, thinks that they may, in similar circumstances, be applied to the brain of the human subject; and he infers that, providing the larger calibre of the cerebral blood-vessels do not constitute an impediment, injuries of the same kind might be inflicted without unfavourable results on the human brain, at least in early life. The principle thus established, may, he believes, on this ground be applied, in cases of accumulation of fluid in the ventricles, to warrant the introduction of a *cannula* so constructed as to enter the ventricles, and remain there until it drained away the fluid either accumulated or accumulating. To introduce a wire corresponding to such a *cannula*, from side to side, through the middle or the lower part of the ventricles, he found to be an operation totally void of danger in small animals, as rabbits, puppies, and cats. In the substance of the brain the foreign body is in a few days surrounded by a tough sheath of coagulable lymph, which may be prevented from adhering by occasionally turning the *cannula* or wire on its axis. In many experiments, Sir William Hamilton found a perforation of this kind produced no apparent bad effect; and several quadrupeds and birds, in which the brain had been thus perforated, continued to exhibit for years the greatest health and vigour, and to possess all their usual instincts and faculties.

These experiments, which are highly interesting to the physiologist, reflect great credit on the zeal and observation of the learned Baronet, who has thus proceeded far in an inquiry which presents numerous difficulties even to the professional man.

The work is concluded with a list of 102 cases, in which the brain, cerebellum, or its envelopes, had been variously diseased or injured, and in which the effects on the different functions are specified. To these, however, our limits will not allow us to give further attention.

As the foregoing article contains statements and observations which, in the opinion of many, may seem to require more than anonymous authority, the author, to prevent misconception, thinks it proper to authenticate them by his name.

David Craigie.

Art. III.—*Elements of Surgery*. By Robert Liston, Fellow of the Royal College of Surgeons of London and Edinburgh, Surgeon to the Royal Infirmary, &c. &c. Part Second. London, Edinburgh, 1831.

The present volume is devoted to the consideration of the following subjects: Injuries of the Head, p. 1—42; Diseases of the Scalp, p. 43—59; Diseases of the Eye and its Appendages, p. 60—149; Nasal Polypi, p. 150—162; Diseases of the Nose, p. 163—177; Abscess of the Antrum, p. 178—180; Ulcers of the Lips, p. 181—184; Congenital Deficiences of the Lips, Palate, &c., p. 187—194; Inflammation of the *Fauces*, p. 195—198; Ulcers of the Palate, p. 201—203; Ulcers of the Tongue, p. 204—213; Affections of the Gums, p. 214—216; *Caries* of the Teeth, p. 217—218; *Spina Ventosa* of the lower jaw, p. 219—222; and Osteo-Sarcoma of the Jaw, p. 223—229; Wounds of the Face and Neck, p. 230—243; Diseases of the Windpipe, p. 244—265; *Pharyngitis* and Stricture of the *Œsophagus*, p. 266—276; Affections of the Ear, p. 277—283; Bronchocele, p. 284—287; Glandular Tumours of the Neck, p. 288—290; Distortion of the Neck, p. 291—294; Opening the external Jugular Vein, p. 295; Ligature of the Carotid Artery, the *Anonyma*, Subclavian, Axillary, and Humeral, p. 296—307; Wounds of the Palmar Arches, p. 308—309; Whitloe, *Onychia*, and Scrofulous *Necrosis* and *Caries* of the Fingers, p. 310—317; *Ganglia*, p. 319; *Exostosis* of the Phalanges and Deformities of the Hands and Feet; Enlargement of the Olecranal *bursa*; Venesection, and its consequences; and, lastly, Affections of the Female Breast.

The manner in which these subjects are treated by the author closely resembles that observed in the first part of the work; and the whole bears the general impress of the same principles in pathology and therapeutics. There is no great attempt at generalization in any part of the treatise, and none to estimate the merits of different modes of treatment; and the views of the author, both on the theory of surgical diseases, and the manner in which he treats them himself, are stated in a plain unvarnished manner, with a tone of decision and an air of confidence which is by no means displeasing. Different parts of the treatise will be read with different degrees of interest, according as the observations of the author have enabled him to take views of the individual subjects more or less novel, and more or less interesting. It is manifest that he holds in sovereign contempt all division of labour in surgery, and regards an accomplished surgeon to be equally expert as an oculist, aurist, dentist, and even skin doctor. Though within certain limits such a combination of attainments is at once practicable and necessary, we fear that the public will not in this point agree with Mr Liston. On one subject, we must say his opinion will always be received with attention. Wherever there is room or indication for operation, he shows so much dexterity and readiness of resource, so much success in mechanical contrivances, that both oculist and aurist may be benefited by his instructions. In those departments of surgery, however, which approach the confines of medicine, or even encroach on the province of the physician, we doubt whether Mr Liston employs his time or that of his pupil to the best advantage. On this topic, nevertheless, we are not desirous to be nicely critical, and we are willing to receive the Elements as they are given,—as embodying the results of the experience of a practical surgeon.

The observations on the effects of injuries of the head, and the mode of obviating them, will be read with interest. The theory of the operation of concussion is indeed not altogether perfect; but it makes at least an approach to what in all probability takes place in the delicate texture of the brain. Detachment of the brain from its cranial connections, though an occasional, is certainly not a necessary, effect of that accident; and condensation, perhaps, is confined to the most severe forms of the injury. The mere circumstance of a violent impulse being suddenly transmitted through the substance of the organ by a body so firm as the scull, may, on the ordinary principles of mechanics, be understood to occasion all the mischief by the sudden contraction and expansion of the component particles in any given line,—exactly as a smart blow struck on a surface of ice is transmitted through its entire thickness with sufficient force to kill a fish in the subjacent water. The subsequent symptoms are the physiological and pathological effects of reaction in the effort of the organ to return to its original state.

Mr Liston properly condemns the old practice of indiscriminately perforating the skull in all cases of injury of the head, whether concussion, fracture, or compression; and impresses the necessity of treating these cases according to the variety of symptoms which they present. Whenever bone is much depressed, it must be elevated, and, if needful, removed; inflammatory symptoms are to be controlled by antiphlogistic remedies; and if it can be clearly established that blood is effused, or purulent matter compresses the brain, perforation should be performed, and the confined fluids evacuated. Decided, however, as he is on these proceedings when indicated, he expresses himself as equally determined against puncture of the brain for the discharge of hydrocephalic fluid, as an operation unwarrantable, and likely to accelerate the fatal issue.

The observations on the treatment of diseases of the eye are not void of interest; but they are too lengthened to be noticed in detail at present.

On the subject of malignant disease of the maxillary antrum, though Mr Liston gives the ordinary rules for operating, he expresses himself rather hostile to putting them in all cases in execution. To this conclusion he has been led by the result of cases in which, like all other surgeons, he undertook and performed operations. "I have removed," says he, "tumours from the *antrum maxillare*, and from the frontal *sinus*; but the parts become soon occupied by morbid growths of a more formidable character than the preceding. The membrane and bone appear to assume a disposition to generate such; and the fungus (fungous it should be) protrusions cannot be kept down with escharotics, nor (or) with the actual cautery; nor, after free removal with cutting instruments, have escharotics, however freely applied, any effect in preventing the inherent disposition to the disease, and preventing its recurrence." All these changes he ascribes to the original malignant character of the disease; and he therefore infers, from the result of operations already performed, that they are scarcely justifiable.

Certainly, if we look to the usual characters betrayed by this disease, and the difficulty of eradicating it completely and permanently by any operation, the safest rule is not to operate. But to how many surgical operations might not the same rule be applied? Many cases of cancer of the lower lip, of the female breast, many affections of the submaxillary and parotid glands, and several even of the eyeball, would at once on this principle be wrenched from the hands of the operators. It is indeed difficult to say, without actual trial, whether an operation is to be successful in eradicating a disease or not; and when a surgeon is willing to undertake the weighty responsibility of a measure of questionable utility, without the concurrence of his brethren, or even in opposition to their opinion, after explaining all the possible contingencies to the patient and his friends, it is rather a hard measure to prohibit operation as either useless or injurious. At all events, we are happy to see that a surgeon, whose love of operation has always formed a prominent feature in his character, undertakes to set bounds to this resource, and, restraining it to its appropriate domains, is anxious to rescue the art from a reproach to which its best friends cannot deny that it has been too much exposed.

The proposal to detach and remove the superior maxillary bone for the cure of this disease, Mr Liston justly regards as a severe operation, and one which places the life of the patient in imminent jeopardy from profuse hemorrhage, or violent constitutional disturbance. To obviate the former accident the common carotid has been tied, but, according to the statements of Mr Liston, with little effect on the hemorrhage; and even the ligature of the common trunk of the temporal and internal maxillary artery, eight days after, did not seem to produce much benefit. We believe, however, that not merely the hemorrhage must be an impediment to this operation. The violent and extensive local inflammation so liable to involve the base of the brain, forms an objection almost insurmountable, even on the supposition that the hemorrhage could be restrained; which we believe it always may. The proposal is nevertheless, it must be said, a bold, and by no means an irrational one; and Mr Liston himself properly admits, that the grand objection consists in the disease never being presented to the surgeon till it has involved too many parts and engrossed too great a surface; and that, at an early period of the malady, the complete excision of the bone is in every respect an operation infinitely preferable to the old one of trephining the *antrum*, and dissecting away the *parietes* of the superior maxillary bone.

We regret to remark, that the author, in alluding to the result of this operation, has thought it necessary to say, that "there is reason to complain of want of candour as regards the ultimate result." Language of this kind we do not like to see employed by the members of the profession of surgery, no more than by those of medicine. Without espousing any side, on questions either of science or practice, we must be allowed to say, that we cannot imagine any one to be void of candour in stating the results of cases treated, so long as he shows no intention or desire to give a different statement from the true one. Every one conversant with surgical practice knows that a case may do well for a considerable time, and be regarded and reported as cured, which at a future period may relapse to its original malignity, and frustrate all the fond expectations of the surgeon. It is rather a severe censure to aggravate the unavoidable disappointment experienced by every generous mind on an occasion so melancholy, by complaints of want of candour. There are few professions in which there is more occasion for the exercise of mutual charity and forbearance than that of the art of healing; and every one who wishes well to it, will discourage every feeling of an opposite description.

Ligature of the common carotid, Mr Liston justly regards as inadequate to arrest the progress of a disease so unmanageable; and we confess that we must suspend our assent to the efficacy of such a measure.

In *osteo-sarcoma* of the *antrum*, Mr Liston admits the necessity of excision of the maxillary bone, and recommends its early performance. He gives a case in which the operation was quite successful.

His mode of treating *spina ventosa* of the lower jaw is extremely good, both in theory, and in its practical results. The great object is to procure a free exit for the morbid secretions from the *cancelli*. In slight cases removal of one or more teeth is generally adequate to this effect. In more extensive forms of the disease, a counter-opening at the base of the jaw is required; and it is important to retain this pervious, by the introduction of a cord from the opening in the mouth, through the counter-opening, and drawing it backwards and forwards in the artificial canal thus formed. The counter-opening is at once made, and the cord introduced by means of a strong needle fixed in a handle.

In cases of large and more extensive *spina ventosa*, measures still more energetic become requisite. After dividing the integuments for a sufficient extent, the bone, which is always softened, should be divided by means of a strong bistoury down to the diseased cavity, the morbid bone should be removed, and the cavity exposed, and should then be dressed from the bottom. As the discharge obtains free vent, the tumefaction begins to diminish, the medullary membrane ceases to secrete matter, and granulations are formed from the bottom of the cavity. In this manner large tumours may be made to contract and disappear in a few weeks; and a perfect cure is finally obtained.

The mode of removing osteo-sarcomatous tumours of the jaw is not less efficient. On this, however, our limits will not allow us to dwell. In disarticulating one side of the jaw, Mr Liston dissuades the operator from attempting the preliminary measure of tying the carotid, so generally recommended,—on the ground, that the flow of blood is easily restrained without it, and when it is performed, the patient undergoes two operations instead of one.

Division of the nerves of the face, in cases of *prosopalgia*, Mr Liston condemns as unwarrantable, unless after the unavailing trial of every other method of treatment, and at the urgent request of the patient. More extensive acquaintance with this disease than we had when the operation was proposed, has now, we believe, satisfied most medical men that the operation is in 99 of 100 cases totally inadequate to effect a cure. It is not only not a local disease; but after division, nay, excision of the nerve, it is liable to recur. In the lamentable case of the late Dr Pemberton, we believe several of the facial nerves had been repeatedly divided, or had portions removed,—according to some statements at least eighteen or twenty times,—yet with nothing more than a temporary alleviation of the disease, under the irritation of which this distinguished physician finally sunk. Mr Liston properly recommends, with the removal of local irritations, strict attention to the digestive organs, and the administration of purgatives, tonics, and anodynes, with the external use of nitrate of silver. The most effectual remedies against this agonizing disorder are improvement of the alimentary organs, and the general health thereby, by the judicious combination of purgatives, tonics, and anodynes, with proper regimen, gentle exercise, and residence in a mild and steady climate.

The observations on the management of wounds of the throat and respiratory passages are judicious, and will be perused by the student both with interest and advantage.

The discussion on the causes and effects of croup, though not void of interest, is rather out of place in such a work, in which, certainly, the great object of the author must be to consider only the surgical treatment of internal or medical diseases. In the management of this disease, we agree with Mr Liston, that the application of leeches is not contraindicated, as has been imagined, by any difficulty in restraining the hemorrhage, which can always be commanded by appropriate measures, and, at the most, by twisting the wounds. But we conceive it is infinitely less effectual than bleeding from the jugular vein or the arm, in consequence of the long time which is spent before a quantity of blood adequate to make an impression on the disease is withdrawn. In mild cases, which may recover without leeches, these animals are applied, and, consequently, seem to be beneficial. In severe cases, they are of no use whatever ; and general bleeding by the lancet should be immediately employed. We are pleased to see, however, that Mr Liston applies the pathology of this disease to demonstrate the futility of that most absurd of all operations,—tracheotomy for the cure of croup. No artificial aperture in the windpipe can ever alleviate an impediment in respiration which is not confined to one spot, but extends into the bronchial tubes, as we now know, from the researches of Cheyne and others, the inflammation of croup almost invariably does.

Tracheotomy, on the contrary, is the only good and efficient operation in *cynanche laryngea*, because in that disease the *glottis* and its *rima* being most remarkably affected with obstruction, the artificial aperture must be made below the situation of this natural opening, in order to enable the patient to breathe, until the parts detumesce, and the natural outlet recovers its original calibre; and it is preferable to laryngotomy, because, says Mr Liston, the disease may extend so far down, that, if the operator divides the crico-thyroid membrane, he may cut into the very centre of the disease; and it is, under all circumstances, desirable to make the new incisions as remote as possible from the seat of the disease. In the same manner, and much for the same reasons, in cases of foreign bodies slipping into the windpipe, tracheotomy is always preferable, in Mr Liston's opinion, to laryngotomy. In one case only, that of a foreign body impacted in the *rima*, laryngotomy is preferable to tracheotomy; and in this even, Mr Liston argues, the incision of the tracheal rings may be extended upwards with less injury than the laryngeal cartilages can be divided.

In the operation of puncture of the tympanal membrane for deafness depending on obstruction of the Eustachian tube, Mr Liston practises what must be regarded as a decided improvement. Instead of the trocar used for that operation, as the wound made almost invariably closes, and renders repetition of the puncture requisite, he employs a punch similar to that used for cutting holes in leather, with a keen edge, and, by a rapid rotatory motion, attempts to cut out a circular portion of the membrane. This method Mr Liston has successfully employed in a case in which repeated punctures had been made without the effect of remaining permanently open.

The directions for securing the common carotid, the *anonyma*, the subclavian, and the axillary artery, are given with the usual ability of the author. To detail them, however, is unnecessary; and, indeed, we must make a hasty conclusion.

We have already specified several of the peculiarities, and noticed most of the excellencies of this treatise. Even-handed justice requires us to advert to a few of those singularities which the common sense of mankind agree in stamping as blemishes in such a work. It is manifest that Mr Liston regards it as quite superfluous to pay much attention to the language which he employs to state his opinions and convey his instructions; and this we admit to be, within certain limits, a point of indifference, providing the matter is valuable. There are proofs, however, not only of some negligence, but of taste not altogether good in the use of terms and modes of expression. Thus, at p. 247, he states, "the patient *succumbs*;" he speaks in 264 of "the *withdrawal* of the tube;" and in 286, he introduces the patients perishing "under the hands of the *knivesmen*." He seems also a little too partial to violent figures and strong terms. Thus the consequence of an enlarged nose is not only obstructed vision, but impediment to the introduction of food, solid and liquid; and "*the lobes tumble into the wine-glass, spoon and cup*, and sometimes they are so elongated as to require being pulled aside

in order to uncover the mouth;" p. 177. The mention of th
use of the stomach-pump is animated by a sarcasm on the re
diness which many persons have shown to render themselv
subjects for the operation. "People, too, seem to indulge th
inventors by swallowing deleterious substances much more fr
quently than before. There has been a demand for cases
poisoning, and the supply has kept pace with the deman
Now-a-days twenty seem to attempt suicide by poison for on
that did so long ago." P. 277. The wittiness of this we by n
means wish to question; but its decorousness in a system of su
gical instruction may be doubted. Mr Liston might surel
when speaking of routine practitioners, and the frequency wit
which they practise venesection, have had recourse to a figu
less trite and colloquial than that of "a peg to hang an idea up
on," and might have been less severe on these unfortunate pe
sons. Assuredly the want of such a convenience is not so muc
a fault as a misfortune, and merits the commiseration and sym
pathy of more favoured individuals.

ART. IV.—*The Principles of Surgery*. By JAMES SYMI
F. R. S. E. Fellow of the Royal Colleges of Surgeons i
London and Edinburgh, Surgeon to the Edinburgh Surgic
Hospital, and Lecturer on Surgery in Edinburgh. Edi
burgh, 1831. 8vo. Pp. 347.

THIS volume is the first of an elementary work on the princ
ples and practice of surgery, similar to that noticed in the prece
ing article, and designed as a text-book to accompany the pu
lic instructions of the author. From a syllabus of those i
structions prefixed to the work, the present volume appears
embrace about one-third of the whole, in which the followin
subjects are treated in fourteen successive chapters; Inflamm
tion and its consequences, Chap. I.—VI.; Diseased Nutritio
VII.; Diseases of the Blood-vessels, VIII.; External Injurie
IX.; Amputation, X.; Injuries and Diseases of the Bones, XI.
Injuries and Diseases of the Joints, XII.; Injuries and Di
eases of the Muscles, XIII.; and, lastly, Injuries and Diseas
of the Tendons, XIV.

In treating these subjects, Mr Syme has laid before his re
ders a just, and in general as complete a view of the prese
state of knowledge as the nature and limits of such a work wi
admit. He has in general studied to exhibit a correct view
the labours and inquiries of pathologists, in improving th
theory and practice of surgery; and while he has not neglect

to notice the views and modes of treatment of other surgeons, he has not assigned to his own any more prominent place than they deserve. He, nevertheless, always points out the practice which he conceives most rational; and he speaks with that confidence which personal experience alone can justify.

It comes not within our purpose to enter into a formal or detailed analysis of elementary works, since such a course unavoidably leads to repetition of numerous trivial or well-known circumstances; and we see no reason for deviating from this practice on the present occasion. It is, nevertheless, proper to say, that, even on subjects sufficiently trite and common-place, the author of this volume has contrived to give a considerable proportion of interesting information. One of the best examples of this, under the head of inflammation, is the account of the effects of blood-letting and hemorrhage, sinking and reaction,—in which, though there is no originality, there is, nevertheless, great merit in making the student well acquainted with this alarming state of the system. Next to teaching a practitioner when to recognize the necessity of copious depletion of the vascular system, and the extent to which it should be carried, is, we are convinced, the service of apprizing him of its pernicious effects, when pushed to an excessive degree.

In the chapter on *Diseased Nutrition* is given a clear account of the different forms of sarcomatous growths and encysted tumours, according to the arrangement of Mr Abernethy. Under this head, however, we must mention an omission in such a treatise, in failing to advert to the morbid anatomy of several of the varieties of *carcinoma*, as developed by Dr Hodgkin of London. From an observer whose opportunities are so extensive as those of Mr Syme, some information might have been reasonably expected, as to the degree to which his observation has accorded with that of Dr Hodgkin.

The chapter on the diseases and injuries of the blood-vessels is interesting, and gives a good view of the progressive improvement in the pathology and treatment of aneurism. The history of the successive operations, though not complete, will be perused with advantage by the surgical reader. This is followed by a short account of the diseases of veins, and the methods employed by the surgeon for their removal.

In the ninth chapter, on external injuries, Mr Syme introduces a short sketch of the improved treatment of gunshot wounds, practised by modern surgeons, and considers the best mode of obviating the effects of the injuries resulting from extreme cold and heat.

With the opinions of Mr Syme on the best mode of performing amputation, the readers of this Journal are already acquainted. The chapter on this subject, nevertheless, deserves the particular attention of the practical surgeon, because it embodies the most just views on this operation, and places the merits of the method by the flap in the clearest light.

The next chapter on the injuries and diseases incident to bones, gives a full, and, on the whole, correct view of the state of professional opinion on the pathology and treatment of these affections. The part which treats of diseases of the vertebræ and incurvations of the spine, may be specified as peculiarly good; and though to the readers of this Journal the manner of Mr Syme is sufficiently well known, it may not be irrelevant to subjoin the following observations on the nature, causes, and treatment, of the most common form of spinal deformity, that of lateral curvature of the spinal column, as a fair specimen of the manner in which the work is written.

"In ascertaining the cause and nature of this curvature, the following circumstances, which attend its commencement, must be carefully recollected:—1. It occurs almost exclusively in females, who devote a large proportion of their time, during the period when the morbid disposition exists, to the pursuits usually followed in acquiring a fashionable education, and in those who follow a sedentary occupation, which does not require or permit much bodily exertion. 2. It usually affects most seriously those individuals who possess a slender frame, or one characterized by indications of a phlegmatic temperament,—their bodies, though large and stout-looking, being pale, flabby, and prone to all morbid states depending on weakness of action. 3. Other things being equal, it occurs most certainly, and proceeds most rapidly, when the trunk is habitually maintained in a bent position.

"The predisposition to the disease, therefore, appears to be constitutional weakness, and its exciting causes, circumstances which increase the weakness of the spine particularly, and promote its bending by the figure they make it assume. The strength of the spine depends partly upon the bones, and partly upon the muscles composing it; and it is probable that the former are chiefly affected by the predisposition, while the latter are influenced more by the exciting causes. All muscles require frequent exercise for the preservation of their strength; but, during the occupations of drawing, playing, sewing, &c. while the extremities are either constantly employed, or, at all events, unrestrained in their movements, the trunk is not only held perfectly steady in one position, often a curved one, but also compressed with the rigid articles of dress which are used under the erroneous expectation of improving the shape. The muscles of the back, therefore, becoming extremely weak, and, indeed, as may be learned by actual examination, almost completely absorbed, are no longer able to restore the erect position of the spine when bent by the weight of the head and superior extremities, or by the occupation of the patient. It consequently assumes a permanent curve; and then the predisposition, which depends on a softened state of the bone, acts with full effect; because the more the column bends, the longer levers are afforded to the superincumbent pressure. As the distortion increases, the viscera of the thorax and abdomen are more and more compressed and displaced, their functions suffer corresponding derangement, and the whole system becoming disordered, the bones even less properly nourished than before, lose still more of their resisting power. Should the patient unfortunately, during this process, fall into the hands of a machine-maker, who attempts to prop up the weak and twisted spine by means of iron frame-works, the morbid alterations which have been described will be accelerated; for all such contrivances must prove either insupportable to the patient, or inefficient in straightening the spine; and granting even that they could accomplish this, they would still labour under the great objection of confining the movements of the trunk, and preventing the muscles from obtaining that exercise which is essential to the recovery of their strength. The result would be not more satisfactory if the practitioner were to go to the opposite extreme, and, regarding the muscles as the sole seat of the disease, attempt to strengthen them by enjoining long-continued exercise in the erect posture, or still worse, recommending a weight to be carried on the head, in order to render their actions in balancing it more energetic than usual. Such practice, however useful in preventing curvature, must manifestly tend to increase it when once commenced.

"In the management of persons predisposed by their age, sex, temperament, or constitutional make to this disease, every means ought to be used for strengthening the system in general, and the trunk in particular. All long-continued and constrained positions must be interdicted,—frequent exercise of such kind as calls into action the muscles of the trunk should be enjoined. The use of stays, corsets, and every rigid article of dress, however designated, must be strictly prohibited. If curvature has already taken place, it is evident that the first step towards reparation must be relieving the weak and bent spine from pressure. The only mode of effectually accomplishing this is to make the patient assume the horizontal posture, which can be done without any great hardship, if a smooth well stuffed sofa is provided, instead of the floor or a board, which is sometimes used for the purpose. The warm bath ought to be employed, if possible two or three times a-week, and the back should be rubbed with some stimulating liniment for twenty minutes every night and morning. When the curvature begins to diminish, the patient may rise occasionally for a few minutes, and exercise the muscles by some suitable employment, which ought never to be continued after the slightest feeling of fatigue is experienced. By persisting in this system, the disease will certainly be arrested in its course, the distortion, if not very great, will be removed, and the worst cases will be considerably improved." Pp. 279—282.

From this extract, as well as the foregoing account of the general contents of this volume, as accurate an idea may be obtained as it is possible to form by any method short of attentive perusal. We hope it will induce our surgical readers, whose engagements do not permit them to study treatises more elaborate, to have recourse to the present. It is at all events well calculated to give beginners sound notions of the diseases with which they will have to contend, and the means by which they must endeavour to oppose them, or to counteract their effects. By one circumstance it is particularly recommended. If it be less comprehensive and elaborate than some other systems, it affords, so far as it has gone, no great scope for censure, either in the way of error or omission.

ART. V.—*The Cyclopædia of Practical Medicine.* Edited by JOHN FORBES, M. D., ALEXANDER TWEEDIE, M. D., and JOHN CONOLLY, M. D. Part I. London. January 1832. Large 8vo. Pp. 112.

OUR limits allow us to notice this specimen of the present work only in a very general and cursory manner. The articles treated are, *Exploration of the Abdomen*, *Abortion*, *Abscess*, *Abstinence*, *Achor*, *Acne*, *Acupuncture*, *Age*, *Change of Air*, *Alopecia*, *Alteratives*, *Amaurosis*, *Amenorrhœa*, *Anæmia*, *Anasarca*, *Angina Pectoris*, *Anodynes*, *Anthelmintics*, *Antiphlogistic Regimen*, *Antispasmodics*, and *Aneurism of the Aorta.* The names of the writers of the different articles are attached to their respective contributions,—a measure of which we highly approve, as one calculated not only to render the authors circumspect in the selection and arrangement of their materials, but to give readers confidence in the statements and opinions advanced. This circumstance, however, favourable as it is in these two respects, augments somewhat the difficulty of the task which we have now to perform. Had the names been withheld, we should feel little delicacy in saying which papers were the best and which the worst; for we believe that difference in quality is a necessary and almost unavoidable evil in all works compiled in the manner of the present. But we are aware, that, when we commend one article, some persons may infer that a censure is conveyed in others not so specified; and, on the contrary, to say that all the articles are excellent, is only an indiscriminate species of commendation, which every one must see implies nothing. While, therefore, we profess to be quite aware of the invidious character of all comparisons, and, therefore, will avoid drawing any, we shall say shortly what we think of the articles in the present number.

In the first place, then, presuming that a work constructed on the principles of the present in the alphabetical order is requisite, and that the plan is judicious, the present number must be allowed to be tolerably well executed. There is, indeed, nothing very astonishing, very new, or overpowering in the information communicated, in the principles laid down, or in the inferences deduced. Every thing is in sober, business-like style. This is on the whole an advantage; for though it is the way of the world when a new work, on a new plan, is announced, to form high and rather extravagant expectations of the prodigious changes to be effected in every department of the subject treated, common sense whispers, that science scarcely admits of these brilliant and showy proceedings, and that all must proceed slowly, uniformly, and progressively,—in the manner of Œdipus, to use an allusion of Bacon,—on the sure feet of observation and experiment. This, so far as we have hitherto gone, is the general character of the present number. The most essential information on all the subjects treated, is brought forward in a practical unpretending manner, not in such detail as to exhaust the subject, yet with as much as is requisite to communicate tolerably correct notions on each.

In the second place, we may safely say that several of the articles are very good, because they contain, on subjects hitherto not very much or generally explored, a good deal of interesting matter. Those on the *Exploration* of the abdomen and on *Angina pectoris* by Dr Forbes; that on Age by Dr Roget; that on Amaurosis by Dr Jacob; and that on Aneurism of the Aorta by Dr Hope, belong to this class. The article on *Angina pectoris* indeed, contains, we think, the best and most complete account of that disease extant; and we are happy to see this subject treated by one who can do so in a comprehensive and scientific manner. The article on abscess by Dr Tweedie, gives a fair view of the state of knowledge, pathological and practical, on the various forms of that consequence of inflammation in the principal textures. A censorious and rigid judge might perhaps object to some parts of it; for instance in regarding tubercular *vomicæ* and the purulent collections of the serous membranes as abscesses. The article on *change of air* by Dr J. Clark is also written with the usual ability of this author on such subjects. That on *anæmia* by Dr Marshal Hall, presents a short view of all the interesting facts which the researches of that diligent observer have enabled him to collect on this dangerous condition of the animal frame. The account of the practice of *acupuncture* by Dr Elliotson, though too short to satisfy the enthusiastic admirers of that practice, is nevertheless quite long enough for the subject, and is written with the spirit and interest by which the productions of that author are distinguished. The article on abortion by Dr Lee gives in a short compass a good view of the causes of that accident, and the most likely means of preventing its occurrence. If, however, we proceed in this manner, we will involve ourselves in superfluous details and trivial observations—a sin which we always wish to avoid, however unsuccessfully.

We have, however, one remark not altogether trivial, and important at least to the editors, to offer. The number is, we are satisfied, too costly for its extent. The editors must either endeavour to give somewhat more matter for the price, or they must abate their charge, if they wish an extensive circulation. Many a reader who would be inclined to provide himself with the Cyclopædia of Practical Medicine, will pause when he reflects that he pays five shillings for 112 octavo pages, even though they are a little large. Notwithstanding this objection, however, we shall be glad to see the work find its way among the profession generally.

ART VI.—*A Demonstration of the Nerves of the Human Body.* Consisting of Four Parts. By JOSEPH SWAN. Part II. London, 1831.

THE present part, the second of that noticed in Vol. xxxv. which is devoted to the important subject of the Lumbar and Sacral portions of the Sympathetic, and the nerves of the Abdominal Viscera, contains five engravings shaded, and an equal number of outline duplicates, in which various views of the several divisions of this interesting part of the nervous system are represented.

After a short but clear account of the lumbar and sacral portions of the sympathetic nerve on both sides of the body, and the mode in which the splanchnic nerves are constituted and distributed, Mr Swan proceeds to exhibit the multiplied ramifications of these nerves in the fifth plate, or the first of the present part. The engraving, which is a lateral view of the lumbar and sacral nerves of the right side of the body, gives a very beautiful and distinct representation of the great splanchnic nerve, the semilunar ganglia, most of the hepatic plexus and nerves, several branches of the superior mesenteric plexus, the inferior mesenteric plexus, and several of its branches, the renal, spermatic, and hypogastric plexus of the right side, the hypogastric plexus of the left side, with several of the sacral ganglia, the nerves of the bladder, and those of the penis.

In the sixth engraving the same objects, as they occur on the left side, are exhibited with the same accuracy, and not less minuteness. These two engravings, in short, give a very complete idea of the arrangement and ramification of the nerves distributed to the alimentary, the urinary, and the reproductive organs.

The seventh plate gives an excellent view of the branches of the left or anterior trunk of the pneumogastric nerve, the left hepatic plexus, and the portions of the cœliac and right hepatic plexus on the anterior surface of the cœliac and hepatic arteries. These form several of the communications between the pneumogastric and great sympathetic nerves.

In the eighth engraving, the nerves accompanying the superior mesenteric artery are represented.

The ninth plate consists of four figures. The first of these shows, by a very distinct lateral view on the right side of the body, the continuation of the sympathetic nerve, and the greater and smaller splanchnic nerves, as they pass from the *thorax* to the *abdomen*. The second gives a detailed front view of the semilunar ganglia and their connections, with the renal capsules. The figures are perhaps rather exaggerated in size, and something stiff and harsh in representation; but they are, on the whole, as anatomically accurate as objects liable to varieties in different subjects can be. The third figure gives a lateral view of the prolongation of the sympathetic nerve, and the great and small splanchnic nerves passing through the diaphragm, the connection of the right semilunar ganglion, with the renal capsule, the union of the right semilunar ganglion with the right phrenic nerve, and the branches sent from this to the inferior *cava*, and communicating with the right hepatic plexus.

From this sketch we trust it will easily appear how assiduously Mr Swan has exerted himself to give minute and accurate views of this important division of the nervous system. It is only justice to say, that he has succeeded extremely well in giving very good engravings of his dissections; and we are convinced, from the two specimens now before us, which we regard as the best examples of anatomical engraving yet executed in this country,—that the work undertaken by Mr Swan will, when completed, be the most magnificent as well as the most useful that the anatomist has for a long time received. They will contribute, we hope, to diffuse a taste for the study of neurology in this country. In conclusion, Mr Swan, we think, has great merit in this undertaking; and we sincerely trust he will meet with that success to which labours so creditable and beneficial are justly entitled.

PART III.

MEDICAL INTELLIGENCE.

ANATOMY.

A Third proper Ligament of the Scapula, not yet observed in our Dissectors, or by Anatomical Lecturers. By E. B. Sherriffs, Esq. Brechin.—No ligaments in the human body have been more particularly described, or perhaps better classified by anatomists, than those connected with the *scapula;* neither is any joint more deserving of attention from its surgical relations than that of the shoulder, into the formation of which the *scapula* enters.

The ligaments connected with this bone are described as either proper or common to it. The latter are described as two in number, viz. the anterior, coraco-acromial or deltoid, and the posterior or coracoid. I, however, universally find a third, extending from the root of *acromion* process to the neck of the *scapula,* and hence it may be consistently denominated the *acromio-cervical* ligament. I generally find the *arteria infra spinalis,* along with its accompanying nerve, pass under this ligament.

In exposing this ligament I must recommend great care to be taken, as it is imbedded in a quantity of cellular substance, and being very weak, it may readily be removed.

I have presented the Hunterian Medical Society with a ligamentous preparation of the shoulder, in which the coraco-cervical ligament is plainly developed.*—17*th December* 1831.

MEDICAL PATHOLOGY.

Protracted Lactation, a cause of Hydrocephalus and other serious disorders in Infants. By Dr Edward Morton.—(*Observations on the Healthy and Diseased Conditions of the Breast, Milk, &c. &c.* By Edward Morton, M. D. Cantab. &c. London, 1831. 8vo. pp. 63.)—The milk of the human female is well known to be liable to be vitiated and lose its healthy nutrient properties from several causes, viz. mental distress or solicitude, indigestion, and disorder of the intestinal functions, however induced, the establishment of the menstrual discharge, and especially from impregnation. It has, indeed, been supposed, that the secretion of milk in the breast is incompatible with the return of the menstrual secretion, and consequently, that impregnation could not take place in women who still continued to nurse. Though this rule is pretty general, it admits of sundry exceptions, depending on individual peculiarities and other causes equally difficult to recognize. Mr Roberton, in a paper in the beginning of the present volume, (p. 5,) shows, for instance, that among a number of 160 married women, of ages varying from 25 to 40, but averaging at 30½, 81 had become pregnant once or oftener during the process of lactation; that of these 81, 27, who had produced together 101 children, had conceived 38 times during lactation; that 42, who had always become pregnant while suckling, did not, on the average, conceive till they had suckled nearly 19⅘ months; and that the residual 22 had been in the habit of conceiving during lactation, and soon after parturition. On the other point, that of menstruating during the process of suckling, Mr Roberton found that although 31 women menstruated regularly during that process, the majority of those who had usually conceived while nursing did *not* menstruate; and that the appearance of the *catamenia* during lactation appeared to have no influence in disposing to conception. Dr Edward Morton, who, however, appears not to be aware of the valuable observations of our correspondent Mr Roberton, which, indeed, were published too late for him to be acquainted with them, has controverted the usual opinion, that a woman does not conceive while nursing, and maintains that the continuance of lactation does not prevent her from becoming pregnant. He infers, however, from a variety of facts given from different authors, and from personal observation, that the milk becomes, by too long suckling, vitiated, and unfit for nourishing the infant. He nowhere specifies the time at which this vitiation is liable to take place; but he thinks, as a general rule, that at 9 months after birth the infant ought to be entirely weaned, and in no case should suckling be continued longer than 10. If the process is continued beyond this time, the mother becomes weak, languid, and emaciated, suffers symptoms of congestion of the head or chest, or both, is distressed with giddiness, swimming of the head, and impaired or double vision, dyspnœa, cough, and profuse expectoration, often with thirst, loss of appetite, profuse night-sweats, sedimentous urine, and loss of flesh, accompanied with gnawing or racking pains in the back and loins. If, however, without being attacked by these symptoms of impaired health, she should happen to conceive, miscarriage is almost the necessary consequence. In such a state of the system, Dr Morton argues it is impossible for the breasts to secrete a healthy nutritious fluid for the nourishment of the child; and while her health and strength are undermined, that of the infant suffers in a degree equally great. The disorders which ensue from this cause are numerous; for instance, gastro-enteric irritability or inflammation, indicated by vomiting, diarrhœa, and constant griping pains; convulsions; epilepsy; various strumous affections, as those of the external lymphatics or even *tabes mesenterica;* but principally, and worst of all, *meningitis,* or that inflammation of the cerebral membranes which terminates in *hydrocephalus,* or water of the brain.

---

* In the preparation presented by Mr Sherriffs to the Hunterian Society, and which we have seen, this ligament certainly is exhibited; and, though very short and small, it may deserve the attention of anatomists to ascertain whether its presence is constant or only accidental.—Ed.

In illustration of these views, Dr Morton gives 18 cases of *meningitis* supervening in protracted lactation; 18 cases in which that disease arose subsequently in consequence of protracted lactation; 15 cases in which *meningitis* supervened in other complaints in children who had been suckled an unusual length of time; and one case in which *meningitis* took place in a child nursed by a woman who had been delivered *one year and nine months.* In the first class of cases, none of the infants had been suckled less than 12 months, one was 13 months, three had been 14 months, two were 17 months, one was 19, one was 20 months, one 21, two 22, one 23, two 2 years, two 2 years and six months, and one 2 years and a few months. *Ten* of these infants died of the disease; the other *eight* were admitted with manifest symptoms. In the second class, consisting of two children of 5 years of age, two of 7, three of 3 and 4 years, and four of 6,—the ages of the others not being mentioned,—one child was suckled 12 months, four 13 months, three 14 months, one 15 months, six 18 months, one 19 months, one 2 years, and one 3 years; and of this class 7 died, and 11 had distinct symptoms of the disease. In the third class, consisting of seven children, varying from 11 to 19 months, five of 2 years, two between 3 and 4, *one* at 4½, and *one* at 6, and which had been at the breast for a period varying from 11 months and a year, to 16 months, 18 months, and 2 years, *ten* were admitted with hooping-cough, complicated with much affection of the head, *two* of which terminated fatally, three were admitted with pneumonia and affection of the head, and one with bronchitis, followed by decided affection of the head.

From these facts, Dr Morton thinks he is entitled to draw the following conclusions: 1*st*, That if children be suckled an undue length of time, in other words, beyond 9 or 10 months, they are liable to be affected with *meningitis*, or inflammation of the cerebral membrane, terminating generally in effusion of fluid into the ventricles; 2*d*, That, in the event of their not being attacked by the disease during or soon after the time of such protracted suckling, they, nevertheless, acquire a predisposition to cerebral disease, which may break out in any future period of life; 3*d*, That children suckled beyond 9 or 10 months, when labouring under other diseases, are more liable to secondary or symptomatic affection of the head than those nursed otherwise; and *lastly*, that the same effects take place in infants suckled by women who continue to nurse longer than 10 months after parturition, though the infants themselves have not been nursed for too long a period.

In short, the conclusions resulting from the inquiries of Dr Morton are, that the milk of the human female becomes, after the period of about 10 months subsequent to parturition, vitiated, and loses those properties essential to the proper nutrition of the infant; and as this takes place very uniformly, its effects are rather more conspicuous in those infants who are nursed by a woman who has already nursed a previous infant on the milk of the same breast. Thus, the 52d case is that of an infant which was suckled only *nine* months, but by a woman who had previously suckled another infant, and who was now 21 months from the period of parturition.

Dr Morton, however, does not attempt to lay down fixed rules as to the reasonable or the excessive duration of the process in all cases. Some women, from original delicacy of constitution, and feebleness of habit, may, from the beginning, or, at least, a few weeks after parturition, secrete a species of milk very unfit for the nutrition of their offspring; while others, whose frame is more robust, and whose digestive organs are in better order, may continue to secrete milk of good quality beyond the period of 9 or 10 months. In such circumstances, the undue or protracted lactation becomes a relative term,—fluctuating in different individuals according to circumstances.

The mode in which protracted lactation operates, according to Dr Morton, is by inducing irritation of the alimentary organs, the irritation propagated from which soon affects the brain, though in a secondary manner. The improper food gives rise to gastro-enteric irritation, which becomes almost habitual; while the food prepared in this manner, instead of being nutritious, acts almost as a poison. The infant, therefore, not only falls off and wastes, but becomes affected by strumous disease, rickets, and other cachectic disorders.

The practical conclusion from the whole is, that the child should be weaned as soon after the ninth month as possible; and an infant should on no account be nursed by the breast of a woman, from the period of whose parturition more than nine months have elapsed. If, therefore, the mother herself, there is reason to believe, furnishes, even at the fourth or fifth month, a species of milk which induces frequent vomiting and diarrhœa, the infant should be transferred to another whose milk agrees better, and is not followed by effects so injurious. In some instances even it may be preferable to wean the child even at this early period, and to bring him up by hand, as it is termed. In cases in which symptoms of *meningitis* threaten, either of these measures is indispensable; and with them must be combined the appropriate remedies for controlling the meningeal inflammation, leeches, cold lotions, blisters, and purgatives.

These views, we think, are plausible and rational. It is possible they may be carried a little too far; but they are still entitled to much attention from those who have occasion to treat the diseases of children. No one can doubt that much of the soundness of the infantile constitution depends on the nurse, and the qualities of her milk; and many of those diseases which originate in infancy, are evidently coeval with the period of lactation, in whatever manner they may be connected.

One circumstance only deserves attention, as a possible source of fallacy in this inquiry. The connection between protracted suckling and meningeal disease, which Dr Morton regards as that of cause and effect, may be the concurrent effect of an earlier and more general cause. The children who are nursed beyond nine or ten months may require to be so from original feebleness of constitution; and the same feebleness which renders this requisite may induce meningeal inflammation.

Abstract of Cases of Insanity, with Necroscopic Appearances. By Dr Macrobin, Medical Superintendant of the Lunatic Asylum, Aberdeen.—Case 1.—Andrew Braid, æt. 56, admitted 1816 with *monomania elata* and partial *dementia*, and died October 1830 with symptoms of *pneumonia*, having exhibited no marked physical symptoms during his confinement excepting a very irregular and intermitting pulse, and some symptoms referrible to the cardiac region.

Autopsy.—Head. No increased vascularity of the membranes; the substance of the brain was remarkably firm; bloody points numerous and larger. An ounce and a half or two ounces of *serum* in the ventricles.

Chest.—Recent lymph on the left *pleura*; great engorgement of both lungs, especially the left, which was friable, granular, and infiltrated with sero-purulent fluid; the left ventricle of the heart hypertrophied and dilated; abdominal viscera healthy.

Case 2.—John Masson, ætat. 64, admitted 1818 with *mania epileptica*, which appeared at puberty, was found dead in bed, having apparently expired during a fit of epilepsy in October 1830.

Autopsy.—Head. Remarkable conformation of the *cranium*, being very full and prominent behind, and much compressed at the sides; the left hemisphere of the brain much fuller than the right. There was great venous turgescence, but no increased vascularity.

Chest.—The lungs were gorged with sero-sanguinolent fluid; left ventricle of the heart hypertrophied.

Case 3.—George Thompson, ætat. 28, admitted 1823 in a state of fatuity, and died July 1830 with symptoms of *phthisis pulmonalis*, having greatly recovered his intellectual powers a day or two before death.

Autopsy.—The head presented nothing unusual. In the chest there were numerous tubercles in both lungs in different states of softening. In the abdomen there was incipient thickening and ulceration of the mucous membrane of the *ileum* and *colon*.

Case 4.—Isobella Ross, ætat. 50, admitted July 1829 with maniacal excitement, and in the course of a month lapsed into fatuity, and died April 1830 with general dropsy and diarrhœa. She had been long addicted to indulgence in spirituous liquors before admission.

Autopsy.—Head. No appreciable lesion of the brain or its membranes was observed.

Chest.—Tubercles and *vomica* were found in the superior lobes of both lungs, with serous infiltration.

Abdomen.—The liver exhibited the friable granular bright yellow degeneration; ulcers of a small oval shape were dispersed throughout the *ileum*. The mucous membrane of the *cæcum* and *colon* was remarkably thickened, rugous, fungoid-looking, and of a dark colour, and presented here and there large foul irregular ulcers. The cells of the colon were obliterated.

Case 5. Peter Keith, ætat. 66, formerly a seaman in the navy, admitted September 1829 with *monomania elata* and imperfect paralysis of all the voluntary muscles, which increased to complete paralysis some time before his death, which happened January 1831. He had been addicted to spirituous liquors.

Autopsy.—Head. A copious gelatinous deposit was distributed over the entire surface of the brain, forming a layer of some thickness over the anterior lobes. Between the middle and posterior lobes, and near the surface, there was situated an irregular cavity with vascular *parietes*, containing the *debris* of softened cineritious substance. The *ramollisement* extended to the medullary substance, and there was a well marked approach to *ramollisement* of the whole cerebral mass, especially of the cineritious portion.

Case 6.—James Simpson, ætat 38, a seaman, admitted February 1831, with maniacal delirium, very much resembling *delirium tremens*, in regard to the nature of the delusions, the profuse perspirations, and the constant *pervigilum* which were present throughout, though the tremor was absent. After a period of nearly three months, he died in the last degree of emaciation, uncontrollable diarrhœa having supervened. He suffered two attacks of epilepsy, followed by *strabismus*, some time before his death. Was reported to have been *habitually* sober, but experienced the above attack immediately after a fit of intoxication.

Autopsy.—Head. Well-marked increased vascularity of the *pia mater*, with great effusion into the ventricles.

Abdomen. Inflammation and ulceration of the colon.

Case 7.—George Lawson, ætat. 38, a shop-porter, of plethoric and apoplectic tendency, having suffered a slight shock four months previously, admitted November 1830, under great maniacal excitement, which gradually arose to the most violent delirium, under which he sunk exhausted in the course of a month.

Autopsy.—Head. Slight albuminous effusion was found under arachnoid, confined to the anterior and upper part of the hemispheres. Much turgescence of the veins of the *pia mater*.

Case 8.—J. G. a female, ætat. 20, admitted July 1830, with *monomania depressa*, and died 22d of the same month, apparently of exhaustion, consequent on inanition from obstinate refusal to take food previous to admission.

Autopsy.—Head. No morbid appearance discernible. The vessels of the mucous membrane of the *ileum* were arborescent.

Case 9.—M. M. a female, ætat. 72, admitted in 1808, with *manomania elata*, died 1831, with symptoms of *œdema pulmonum*, having had *unasarca* of the lower extremities for some weeks.

Autopsy.—The different cavities exhibited no morbid appearances, with the exception of great condensation and hepatization of the whole of the right lung, with two quarts of serous fluid in the sac of the *pleura* of same side.

Case 10.—J. B. ætat 83, admitted 1812, with *dementia senilis*, general *paralysis* having gradually supervened, died 1831, with symptoms of *pneumonia*.

Autopsy.—Head. Very copious effusion of serum over the entire surface of the brain, and into the ventricles and sheath of the spinal chord, amounting to at least five or six ounces.

Chest. The lower lobe of the left lung was in a state of great engorgement and hepatization, passing into purulent infiltration. Hypertrophy of the left ventricle of the heart.

Case 11.—Margery Grant, ætat 82, admitted 1816, with *dementia se-*

nilis, died September 1331, having suffered from occasional severe attacks of diarrhœa.

Autopsy.—Head. Nothing morbid observed. In the *thorax* the upper part of the right lung was tuberculated.

Abdomen. Ulceration of ileum and colon was found.

Case 12.—Alexander Robertson, ætat. 41, a plumber, admitted February 1830, labouring under a state of great fatuity and general paralysis, constant tremor of the hands, and loss of speech, all of which symptoms followed upon an attack of apoplexy, which occurred three years previously. Had been much subject to headachs, and was reported to have been habitually sober. Died November 1831.

Autopsy.—Head. Highly vascular, layer of dense but recent lymph under the *dura mater*, covering the whole of the right hemisphere, varying from three to four lines in thickness, and causing adhesion of the membranes. Great vascularity of the *pia mater*, extending to the base of the brain, and between the convolutions. Ventricles greatly distended with serum. Thoracic and abdominal viscera quite healthy.

Case 13.—J. W., ætat 50, admitted 28th October 1831, with hypochondriacal monomania, exhibiting great emaciation ; complete anorexia ; much uneasiness of the epigastrium ; and parched, smooth, florid tongue ; died on the 16th November following.

Autopsy.—Head. Pia mater rather vascular, but no effusion over the surface, or into the ventricles of the brain ; the thoracic and abdominal viscera healthy ; the liver only containing two small tubercular masses. The whole tract of the alimentary canal was particularly examined, and exhibited no vascularity or other lesion to correspond with the symptoms of epigastric uneasiness, the state of the tongue, &c. during life.

I have given the foregoing abstract without commentary ; and the only remark I would now venture is, that the nervous system still presents a wide field for pathological research, which must be carefully explored before we can pretend to assign to each case of insanity its true relations, and to draw any thing like general conclusions regarding the nature of those lesions which give birth to this disease in its varied respects. It appears to me, that too much has been ascribed by recent pathologists to increased vascularity of the membranes ; an appearance often doubtful and difficult to decide upon, and at all events often incidental to the morbid actions immediately preceding death ; and that too little is allowed to the probable lesions of the nervous mass itself. We know that the intellectual functions are sometimes restored shortly before death, and that the accession and removal of the disease is not unfrequently sudden ; we ought not, therefore, to anticipate, on all occasions, a well-marked structural derangement. Insanity, indeed, may originate in different pathological conditions of the encephalon ; and these conditions are no doubt in some instances associated with increased vascularity of the membranes, giving rise, I suspect, in the end, to the immense collection of serum not unfrequently observed in the brains of those who unhappily so often pass by degrees from the state of maniacal excitement into that of fatuity, with paralysis, complete or partial,—collections by the way which seem to be formed slowly, if we may judge from the increased firmness and density of the parietes of the ventricles,—their not collapsing on being evacuated, &c. ; and which, therefore, do not prove suddenly fatal. In the one-half of the above cases, however, no increased vascularity or effusion could be discovered, though carefully investigated. Moreover, the treatment which is recommended, and usually found successful in cases of *meningitis*, when applied to insanity, even when the head symptoms appear best marked, is not in general followed by corresponding good effects ; but, on the contrary, will sometimes prove highly prejudicial.

Note.—These examinations were conducted in the presence of professional friends; this I mention, lest it should be supposed that my reports were influenced by any theoretical bias.

Aberdeen Lunatic Asylum, 9th January 1832.

THERAPEUTICS.

Medical Effects of the Beulah Saline Spa at Norwood, Surrey. By Dr George H. Weatherhead. (*Account of the Beulah Saline Spa at Norwood, Surrey.* By G. H. Weatherhead, M. D., &c. London. 1832.)—The village of Norwood stands seven miles south of London, on one of those eminences forming the Norwood hills, and in the middle of a district once covered with oaks, and as such celebrated as a haunt of communities of gypsies or hordes of the Zinganee breed. The air of these hills, which are elevated 390 feet above the level of the sea, is dry, clear, and bracing. From the brow of one of these hills at Beulah, the property of J. D. Smith, Esq. issues a copious saline spring, surrounded by a group of oaks, the only relics of the ancient forest of Norwood. The virtues of this mineral have been long known to the neighbouring peasantry, who have been in the habit of using it in curing ulceration depending on constitutional disorder; but it appears to be only recently that it has attracted much general attention.

When first drawn, the water is transparent and sparkling, with numerous air bells rising to the surface. Its taste is bitter but not unpleasant, leaving in the mouth the flavour of its predominant saline ingredient, the sulphate of magnesia. Its temperature at the bottom of the well is 52° F.; its specific gravity 1011; and, according to the analysis of Messrs Faraday and Hume, a quart of it contains the following proportions of solid ingredients, which, for the sake of contrast, are placed opposite to a similar statement of the analysis of Cheltenham water by Mr Brande.

Beulah Saline.		Cheltenham Saline.	
Sulphate of Magnesia,	123	Sulphate of Magnesia,	22
Sulph. of Soda and Magnesia,	32	Sulphate of Soda,	30
Muriate of Soda,	19	Muriate of Soda,	100
Muriate of Magnesia,	18½	Sulphate of Lime,	9
Carbonate of Lime,	15		
Carbonate of Soda,	3	Grains	161
Grains	210½		

From these comparative statements, it results, in the *first* place, that the gross amount of saline matter in a quart of water is greater in the Beulah than in the Cheltenham by 49½ grains, that is, in round numbers, by nearly one-third; *secondly*, that, while the predominant salt in the Cheltenham is chloride of sodium or common salt, that of the Beulah is sulphate of magnesia or Epsom salt; *thirdly*, that the quantity of the triple salt of soda and magnesia in the Beulah is nearly the same as that of sulphate of soda, or Glauber's salt in the Cheltenham; *fourthly*, that the predominant ingredients in each spring change places entirely, the sulphate of magnesia being most abundant in the Beulah, but the least abundant of the very soluble salts in the Cheltenham, while the chloride of sodium, which is most abundant in the Cheltenham water, becomes very scanty in the Beulah; and *lastly*, that, while the lime is combined with sulphuric acid in the Cheltenham, it is united with carbonic acid in the Beulah spa. The latter, it is to be further remarked, has as yet furnished no trace of iron, of iodine, or of bromine. The Beulah is, therefore, one of the purest and strongest saline springs in this country; and, from the combination of the saline ingredients, on the principle that several neutral saline solutions are more powerful when united than separate even in the same doses, or that smaller doses produce in the combined form more considerable effects than in the detached, it may be expected to be highly energetic and effectual for all the purposes to which saline mineral waters are usually applied.

To this mineral spring, accordingly, Dr Weatherhead seems inclined to ascribe very great powers in the removal of several morbid states of the human frame; and though all advocates for these agents are generally prone to overrate their virtues, we are inclined to think that, on the present occasion, there is little reason to complain of this extreme. Regarding the Beulah as particularly beneficial in all states of the system in which obscure inflammatory action is going on in some internal organ, Dr W. recommends it in various diseases dependent on, or connected with, such action. In dyspeptic disorders, where heat of the palms, brown tongue in the morning, headach, flatulence, and obstruction or derangement of the alvine evacuations indicate the necessity of a system of cooling laxatives, the Beulah is represented as highly beneficial. In liver disease, contracted especially by residence in tropical countries, when there is pain in the hypochondriac region, with sallow complexion, impaired appetite, and disordered urinary secretion, he thinks it entitled *a fortiori* to attention even in a higher degree than the Cheltenham waters. The diuretic qualities of the Beulah spa also, he represents as highly useful in preventing the anasarcouss welling of the feet and legs, so common a consequence of this disease, and in removing it if already established. On the same principle he recommends its use in jaundice and hypochondriasis. In chlorosis, without denying the efficacy of other remedies, and especially that of pure air and residence in the country, he represents it as a powerful auxiliary.

From its power in rectifying the functions of the alimentary canal, Dr Weatherhead regards it as of great use in chronic ophthalmy, whether connected with strumous diathesis or not, and in all these cutaneous affections in which the stomach is irritable, the heptic secretions suppressed or disordered, and the bowels confined. He mentions an instance in which the common *acne* spreading over the face was completely removed by a course of these waters. He remarks, nevertheless, that the first effect is sometimes rather to aggravate than mitigate the eruption; but that this must not discourage the patient from persevering. Lastly, in the mitigation and removal of that state constituting the scrofulous diathesis, he regards it as highly efficacious.

The ordinary dose is a pint taken at two periods, with the interval of a quarter of an hour between each; and from this it varies to less or more, according to the habits and powers of the individual. When taken tepid, it is lighter and more grateful to the stomach, and operates more easily; and this rule should be always observed in winter. The best period of the day is, as in other cases, the morning; but it may be taken at any season of the year. In general, to produce the full effects of the spring on the gastric and hepatic functions, a course of from four to six weeks is requisite; and in obstinate hepatic and cutaneous disorders its use must be continued several weeks longer. It is indispensible, at the same time, that proper attention be paid to diet and regimen.

Institution at Brighton for the Preparation of the Factitious Mineral Waters of the Continent.—Notwithstanding the long established reputation and the admitted efficacy of the mineral springs of Carlsbad, Marienbad, Pyrmont, and Spa, and other places on the Continent, in many chronic disorders, which either baffle medical treatment, or require a long and continued course of persevering management,—a great difficulty in the way of their general employment is the distance to which patients require to go in order to enjoy these advantages, and the distance from each other in cases in which, when one fails, another requires to be tried. Aware of this difficulty, a number of intelligent persons at Dresden, at the suggestion of Dr Struve, many years ago established in that city an institution for the preparation and exhibition of factitious imitations of the principal mineral springs, manufactured according to the most accurate analyses of modern chemistry. The utility of this institution has been fully demonstrated by the success with which it has been attended; and visitors, allured by the facility with which they can in a single town avail themselves of the medicinal effects of any one of the celebrated continental springs, have resorted to it from all parts of the Continent, and many places of this country. Similar establishments for the manufacture of factitious mineral waters have since arisen in different towns on the Continent, as Berlin, Warsaw, Leipsic, Konigsberg, and even Moscow; and all with the general result of affording relief to many persons who could not otherwise have been benefited by this mode of treatment.

Influenced in some degree by the successful issue of the Continental establishments, but more especially induced by the urgent demand for the use of mineral waters in the treatment of many chronic complaints, and the removal of sundry anomalous and undefined forms of impaired health, several public spirited individuals in Brighton determined some years ago on the formation of a similar establishment in that town; and after some time spent in the construction of the necessary apparatus, and making other concomitant arrangements, they were enabled to open the pump-room to the public in the year 1825. The institution has been since that time as beneficial as within so short a period any similar establishment, new and untried in principle, in this country, could be expected to be; and its virtues have been proved experimentally to the satisfaction of many physicians and surgeons in London, and all those of Brighton.

The institution is indeed in every respect calculated to answer the purposes of its erection. It is situate on a rising ground, to the east of the Marine Parade, at a convenient distance for walking from any part of the town. We can bear personal testimony to the excellence of its apparatus, the neatness, cleanliness, and regularity with which it is conducted, and the facilities which are afforded for the administration of all the celebrated continental mineral springs. As to the accuracy with which these are imitated by the waters prepared at the Brighton German Spa, we believe that, when we say that the whole is under the management of Mr Walcker, a native of Germany, whose talents as a practical chemist are well known, we give evidence that will be satisfactory to most rational persons. The pump-room is open every morning from 6 to 11 between May and November; and Mr Walcker is at all times at hand to give directions to visitors. We think it is of the utmost consequence to medical practitioners, and also to invalids, to be aware both of the existence and of the merits of this institution, as it must facilitate very much the treatment of chronic diseases in those whose engagements, though admitting a visit to Brighton, will not allow them to spend time on the Continent.

The selection of Brighton for this establishment in this country, though in several respects not so good a choice as might have been made, presents, nevertheless, various advantages which are of much importance to those whose complaints require the use of the factitious mineral waters of that populous city. A more central situation between the great manufacturing towns might, perhaps, have been selected; and it might have been more advantageous to chuse a situation to the north rather than the south of London. On the other hand, the vicinity of Brighton to the metropolis, only fifty-four miles, or a few hours' drive, the dry bracing air of Brighton, its absorbent soil, its maritime situation, so favourable for sea-bathing, all concur to point it out as at least *one* good station for a factitious mineral water establishment. To the inhabitants of London, indeed, this institution must afford great advantages, since few remedies can be more powerful in removing the bad effects of residence in the metropolis and the usual occupations, and in obviating the approach, or resisting the inroads, of the asthenic condition, emphatically named *Cachexia Londinensis.* To the dyspeptic generally, to the nervous, and those of strumous diathesis, this institution may also afford great benefit.

To communicate some idea of the virtues of the waters prepared at this institution, we subjoin the following account of the warm mineral waters of Carlsbad and Ems, the cold mineral waters of Marienbad, Eger, and Auschowitz, the chalybeates of Pyrmont and Spa, and the saline springs of Seidschutz and Pullna, Seltzer, and Geilnau, as imitated at the Brighton Spa, from Dr Struve of Dresden.

I. *Warm Mineral Waters. The Springs of Carlsbad, viz. the Sprudel, Neubrunnen, Muehlbrunnen, and Theresienbrunnen.*—Carlsbad operates chiefly on the intestinal canal and abdominal viscera, augmenting all the secretions and excretions. It is by no means merely purgative; but alterative—changing and improving the whole assimilative process. Hence it is of great use in obstinate derangements of the digestive functions, in obstructions and swellings of the liver, the mesenteric glands and other viscera of the abdomen, in irregular circulation, particularly of the *vena portæ* in diseases of the bladder and of the uterus.

From its energetic action upon the organs and functions just named, it proves eminently efficacious in most forms of indigestion, in obstinate costiveness and bilious affections, in acidity of the *primæ viæ* and heartburn, in spasms of the stomach and intestines, in jaundice and gall-stones, in some species of cutaneous diseases, in chronic cough and asthma from indigestion, in hæmorrhoidal complaints, in palpitation of the heart and the larger vessels, and in various nervous complaints arising from a disordered state of the abdominal organs, such as chronic headach, hypochondriasis, hysteria, melancholy, tic douloureux, &c. &c.; in some cases of gout and rheumatism, and in various local affections of a constitutional origin. In derangements of the female constitution, and in those diseases of the urinary organs where gravel is formed or a disposition to calculi exists, Carlsbad proves highly beneficial.

Contra-indications.—Hectic habit; tendency to apoplexy or inflammation; internal indurations, approaching to scirrhus or to an advanced degree of suppuration.

Dose.—From 3 to 10 beakers (of 6 ounces each.)

The patient should commence with a few beakers only, and with the springs of a lower temperature; confining himself to these, if he be at all subject to headach, vertigo, or congestions of blood to the head or chest. With persons of a low degree of excitability, the Sprudel usually agrees best.

Many persons are restored to health in a gradual and almost imperceptible manner; whilst with others whose disorders are more severe, the inconveniences incident to their respective complaints not unfrequently appear to be increased, or at least do not lessen, at the commencement. Such patients, after drinking the waters for a week or a fortnight, experience a sensation of lassitude, together with fever and irritability, from the immediate action of the water on the suffering organs. After various critical evacuations by stool, urine, or hæmorrhoids, this state of excitation gradually gives way to health and vigour.

Where the waters operate powerfully on the skin and kidneys, the bowels are sometimes not relaxed at first, and recourse must be had to the assistance of gentle aperients; such as a glass of the Seidschutz or Pullna waters, one or two teaspoonful of the Carlsbad salts, or other opening medicines which the practitioner may find necessary.

The Springs of Ems, viz. the Kesselbrunnen and Kraenchen bear a near resemblance to Carlsbad, and are applicable in the same class of disorders in general, acting less, however, on the bowels than on the skin and kidneys. They are preferable to the other in weak constitutions and in great nervous irritability, and may be safely administered in local complaints, which have proceeded too far to admit of Carlsbad; such as indurations of the glands and of the uterus, in which a tendency to scirrhus is suspected; likewise in a disposition to spitting of blood. They are beneficial in hysterical and spasmodic affections in females; in scrofula (especially in children) and in scrofulous predisposition, in swellings of the joints and in rachitis. Ems exerts a specific influence upon the lungs, and thus proves often of the greatest service in impending pulmonary consumption (provided suppurating tubercles do not exist). In irregular and painful menstruation and other diseases of the uterine system it is particularly efficacious.

Contra-indications.—Cases where internal organs have degenerated too far.

Dose.—From 4 to 10 beakers.

As with Carslbad, an inconvenient feverish sensation occurs *sometimes*, towards the middle of the course.

II. *Cold Mineral Waters. The Kreutzbrunnen of Marienbad.*—Although not so powerful an alterative and desobstruent as the Carlsbad, it is yet suitable in similar cases, where the obstructions of the liver and other organs are less inveterate, and where Carlsbad might occasion congestions, headache or vertigo. It purges more than the other, and accelerates the circulation of the blood less. Thus it is preferable to the Carlsbad in derangements of the digestive organs, accompanied with a heated and feverish state.

Contra-indications.—The same in general as with the Carlsbad.

Dose.—From 3 to 10 beakers.

The Franzensbrunnen of Eger and the Ferdinansbrunnen of Auschowitz may be considered as a medium between the Kreutzbrunnen, and the directly strengthening chalybeates. They are indicated in place of the Kreutzbrunnen, where powerful evacuations are less necessary, or where the constitution is more delicate. They are less admissible in confirmed visceral obstructions, and more advisable where the latter are yet in a state of developement, or where the evil is seated in the nervous system.

The Springs of Pyrmont and Spa are directly strengthening chalybeates. They augment the energy of the vital functions, exerting a powerful influence over the digestive, assimilative, sanguiferous and nervous systems. They prove salutary in the debility consequent on severe diseases, violent bodily or mental exertion, and much loss of blood, as after menorrhagia and hæmorrhoids; in chlorosis; in copious mucous discharges; in protracted diarrhœa, and in chronic catarrh; in irregular, spasmodic, and painful menstruation; in weakness of the constitution of both sexes, in a tendency to abortion, proceeding from true debility; in excessive irritability, in spasms, in nervous vertigo, headach, tic douloureux, and many local pains, depending on deficient energy of the nervous system; in weakness of the eyes, and even in amaurosis; in paralysis; in continued want of appetite; in habitual vomiting, without organic vice; in mucous hæmorrhoids; in a tendency to the generation of worms, and in certain cases of atonic gout and rheumatism.

With irritable and weak constitutions, *Spa* agrees better than Pyrmont.

Contra-indications.—Obstructions and indurations of the abdominal viscera; spitting of blood; hectic or apoplectic predisposition.

Dose.—From 2 to 8 beakers.

With the chalybeates, particular attention is requisite to a free action of the bowels.

The Springs of Seidschutz and Pullna are mild purgative remedies. They are useful as preparatives to Carlsbad; previous to the course of which, they may be taken for from three days to a week. They free the bowels from mucus and bile, removing slighter obstructions of the glands and abdominal viscera.

Dose.—From 1 to 4 beakers.

The Springs of Seltzer and Geilnau, though frequently taken merely as a refreshing beverage, are of great use in correcting acid in the stomach, chronic vomitings (occurring in the morning) and disorders of the kidneys and bladder. With the addition of hot milk, they are often productive of the happiest effect in incipient pulmonary consumption.

Dose.—From 4 to 10 beakers.

Regimen and Diet to be observed during a Course of Mineral Waters.—The waters are to be taken in the early part of the morning, generally fasting. From ten to twenty minutes ought to be allowed to intervene between the successive beakers, during which time, gentle exercise (short of fatigue) ought to be used. With very delicate persons and irritable lungs, hot milk may be added with advantage to some of the waters. The perspiration being usually augmented, the clothing should be warm, and every liability to catch cold carefully guarded against.

Breakfast should not be taken until one hour after the last beaker, and may consist of tea (not over-strong,) coffee, cocoa, or chocolate. The bread should be light and stale, and eaten without much butter.

A due moderation in the quantity of food is equally important with the nature of the diet itself. From the latter, the following articles should be *entirely* excluded, viz. smoked or salted meat, heavy and flatulent vegetables, such as cabbage, new potatoes, &c. all raw fruit and vegetables, iced creams and acids of every description, highly seasoned or fat dishes, cheese, new bread, pastry and heavy puddings.

Spirits, and even strong malt liquors, should be abstained from, and wine only taken in diminished quantity. With the warm mineral waters, the use of *very cold* beverages ought likewise to be limited.

A diet is recommended, consisting of all kinds of butchers' meat (pork excepted) poultry, lean venison, and game of every sort, roasted or boiled; light vegetables, as spinage, French beans, &c.; broths not over-seasoned, sago, &c.; light puddings and ripe fruit, stewed or baked. As beverage, wine diluted with water, or malt liquor of moderate strength.

An inclination to sleep after dinner, especially in a recumbent posture, must be repressed.

The effects of mineral waters are by no means confined to the period of their use: hence the same temperance that is observed during the course, should be persevered in for some time after its conclusion. The course itself, which may last a month, or even longer if the case be an obstinate one, should not be interrupted by any pause, unless with females whose indisposition may intervene.

Cold baths, even in the sea, are altogether incompatible with the use of the warm springs; on the other hand, tepid baths mostly co-operate in restoring the patient to health.—F. A. A. Struve, M. D., *Knight of the Saxon Order of Civil Merit and Fidelity, and Member of several learned Societies.*

TABLE of Analyses of the Principal Mineral Waters of Germany.

Ingredients found in 16 ounces of Water in a dry state. in grains.	Carlsbad.	Ems.	Marien-bad. *Kreutzbr.*	Auschowitz. *Ferdinands-brunnen.*	Eger. *Franzensbr.*
Carbonate of soda,	9.695	10.750	8.26	6.197	5.00
Sulphate of soda	19.689		39.72	22.544	25.50
Muriate of soda,	7.975	7.634	12.45	8.996	7.96
Sulphate of potash,		0.540	0.93		0.93
Muriate of potash,		0.045			
Carbonate of lime,	2.37	1.1407	4.1300	4.016	1.847
Sulphate of lime,					

Sub-phos. of lime,	0.0017				0.014
Fluate of lime,	0.024	0.00192			
Carb. of magnesia,	1.369	0.7887	3.0560	2.4	0.600
Sulph. of magnesia,					
Mur. of magnesia,					
Nitr. of magnesia,					
Alumina, -			0.0075		
Sub-phos. of alum.	0.0024	0.0018			
Carb. of strontian,	0.007	0.0107			
Sulph. of strontian,					
Carbon. of barytes,		0.0029			
Silica, -	0.577	0.4139	0.8800	0.669	0.568
Proto-carb. of iron	0.0278	0.026	0.1760	0.4	0.350
Carb. of manganese	0.006	0.0037	0.0065	0.092	0.006
Total,	41.9239	21.35932	69.616	45.314	42.775
Carb. acid gas in 100 cubic inches,	58	51	125	149.56	154
Temperature (F.)	Sprud 165° Neub. 138° Mühl. 128° Ther. 122°	Kess. 117° Krän. 84°	53.°	49.°	53.°
Analysed by	Berzelius.	Struve.	Struve.	Steinmann.	Struve.

	Pyrmont.	Spa.	Geilnau.	Selters.	Seidschutz.	Pullna.
Carbonate of soda,		0.7375	6.6210	6.155		
Sulphate of soda,	2.14566	0.0375	0.0420		23.4960	123.8
Muriate of soda,		0.44949	0.5430	17.292		
Sulphate of potash,	0.04194	0.07909	0.2872	0.397	4.8940	4.8
Muriate of potash,				0.358		
Carbonate of lime,	5.98824	0.9850	2.9705	2.1870	6.8060	0.77
Sulphate of lime,	7.22132				1.5050	2.6
Sub-phos. of lime,		0.01366			0.0156	0.0035
Fluate of lime,				0.0018		
Carb. of magnesia,	0.32352	1.12278	2.1709	1.3780	1.0980	6.406
Sulph. of magnesia,	2.69752				83.1380	93.086
Mur. of magnesia,	1.12664				1.6300	19.666
Nitr. of magnesia,					7.9070	
Alumina, -			0.0247			
Sub-phos. of alum.	0.01478	0.00851		0.0027	0.0117	
Carb. of strontian,				0.0192		
Sulph. of strontian	0.02063				0.0463	
Carbon. of barytes,				0.0019		
Silica, -	0.49689	0.4985	0.2695	0.302	0.1200	0.176
Proto-carb. of iron,	0.42846	9.3751			0.0127	
Carb. of manganese,	0.04852	0.0519			0.0042	
Total,	20.55412	4.35903	12.9288	28.0946	130.6845	251.3075
Carb. acid gas in 100 cubic inches,	160	136	163.3	130	20.9	6.9
Temperature (F.)	56.°	50.°	51.°	58.°	58.°	58.°
Analysed by	Struve.	Struve.	Struve.	Struve.	Struve.	Struve.

On the Treatment of Malignant Cholera by Tartrate of Antimony. From a Report on the goods of Count G——w, detained in the Government of Saratov.—An unexamined physician, named Lazanov, is said, in the government of Saratov, to have treated cholera in the following manner with very successful results. At the first appearance of the disease, he exhibits in a glass of water eight grains of antimony. The vomiting and purging thus produced carries off bile, by which at the same time improvement is effected. In less violent cases of the disease four, and even two grains may be given. Even pregnant females have endured this method easily, and have afterwards born living children. To very delicate persons, further, instead of the antimony, a mixture of senna, rhubarb, and Glauber's salts were given. For the symptoms remaining after the operation of the antimony, the author recommends several remedies; namely, for pain and heat in the head, the application of clay, moistened with vinegar, to the head and soles of the feet; for the pain under the *sternum* and the exhausting diarrhœa, a sinapism to the pained part, a saturated solution of potass, with citron juice, and the addition of mint-water; for the retention of urine, nitre or water; for hiccup, a drachm and a half of camphor dissolved in hot water; (on this Lichtenstadt asks, should this frightful dose not be named by mistake for so many grains, L.); for spasms, which after a seasonable employment of antimony do not occur, friction, with spirituous and irritating substances, covering with warm hay-seeds, which might happen in a bark or boat for want of a tub, by which the rubbing is accomplished. Circular frictions of the hands and feet are said to be more useful than frictions longitudinally. After the exhibition of the antimony the patients were not unfrequently restored in four hours. After this, however, much precaution is requisite against cold, and with regard to diet.

The utility of the treatment by this method, as evinced by official tables alluded to, but not given in the work of Professor Lichtenstadt, in the vicinity of whom cholera patients were treated with greatly more unfavourable results, is so remarkable as to deserve particular attention. Though it appears hazardous to render the already violent vomiting and purging still more so artificially, yet the favourable result demonstrates the advantage of the method. The fact must, indeed, be taken as it stands, void of all speculation or comment. None of the other remedies recommended for individual symptoms are peculiar, and need not be particularly considered.

MISCELLANEOUS.

The number for June 1831 of the United Service Journal contains some observations on the distribution and duties of the unattached medical staff of the army at home, from which it appears that the establishment is maintained at a very considerable expence, and that savings of very great extent might be effected. These statements, the correctness of which we have no means of ascertaining, are given substantially as they are found in that periodical.

England.—The secretary at war is virtually the chief of the medical department of the army. All communications are put under cover to him, and left open for his inspection. These are forwarded by him to the Medical Board in Berkeley Street, Berkeley Square. On most points he must be referred to, and is so, accordingly, by the Medical Board on their various contents. · To these he must reply; and, finally, the Medical Board communicates his instructions thereon to the parties concerned,—a circuitous and complicated way of transacting business, which occupies generally five or six days,—thus interfering materially with the necessary despatch of official matters, independent of the great additional expence occasioned by the employment of an unnecessary number of individuals and clerks in both offices, besides an expensive establishment of two houses, messengers, &c. &c. in Berkeley Street. The total expence of this establishment, including stationary, &c. cannot amount to less than L. 6000 a-year, being little less than that of the commander-in-chief's department; and it must appear the more useless, when it is considered that this expensive establishment has no control over the medical concerns of the two regiments of Life Guards,—the Blues,—the six battalions of Foot Guards,—the nine battalions of Artillery,—the Royal Engineers, and the large force stationed in Ireland, as well as the whole of his Majesty's forces employed in India, together amounting to about fifty battalions,—excepting the patronage of the latter, and the mere receipt and communication of late to the commander-in-chief of their sick returns. The only other duty which they occasionally perform, is to examine sick and wounded officers, and the qualifications of candidates for medical appointments,—a duty, the former part of which must in these times be inconsiderable, while the latter is unnecessary. Each individual must be actually possessed of the necessary qualifications from the different colleges of the united kingdom before he can be so employed. As a remarkable contrast to this, the whole of the medical concerns of the navy, in every part of the globe, are conducted by one individual, (Sir W. Burnet,) to whom of late a naval surgeon, to act as an assistant, has been allowed; and the responsible duties of the commissariat department, one of the most extensive in the service, are conducted by an individual attached to the treasury. The deputy commissary-general formerly doing duty there, we believe, has even been removed. These facts are stated to show, in as few words as possible, if such were necessary, the inutility of the expensive establishment of what is called the Army Medical Board; and it is only required to peruse the War-Office correspondence and records of Lord Palmerston, and more particularly those of Sir Henry Hardinge, whilst secretaries at war, to be satisfied of the inefficiency of that institution, as at present constituted.

It may be here also observed, that unnecessary expense is entailed by the superfluous medical establishments of Chelsea and the Military Asylum, occupying no fewer than a physician, two surgeons, and two assistant-surgeons, whereas the latter might be sufficient for the duties; and, instead of civilians, should be supplied from the army to relieve the half-pay list, and to afford employment for officers liable to reduction. There is also unnecessary expence incurred by the employment of three surgeons, majors of the Foot Guards, which the rest of the Household troops, viz. the Horse Guards and Blues, do without.

At Woolwich, also, there is a director-general and establishment of supernumerary officers and clerks, which cannot cost less than L.3000 a-year for the management, including engineers of about twelve battalions, which, if added with the Household troops in those times to the line, would give no great additional trouble, and might, in all, produce a saving of about L.5000 a-year.

In the garrison of Portsmouth there are two useless appointments, viz. that of physician and surgeon; the former held for nearly the last twenty years by the director-general of the army medical department, in addition to his salary as such of L. 2000 a-year, who never did a day's duty, the income of 9s. 6d. per diem, whilst the public is burdened with the expence of L.500 by the employment of a staff-surgeon to do this duty.

Scotland.—The medical department here is well arranged, there being only two staff-surgeons employed for duties of inspection and recruiting, &c.

Ireland.—The medical expenditure of Ireland has always been on the most extravagant scale; and while armies in the field, and occupying foreign countries during the war, containing more troops than Ireland ever did, have been considered well provided for, and most efficiently managed by an inspector of hospitals, it will scarcely be credited, that in this province there is a director-general of hospitals, a physician-general, and surgeon-general, besides two deputy-inspectors-general of hospitals, four staff-surgeons, five assistants do., two deputy-purveyors and apothecaries, one principal secretary and several clerks, *besides* the medical staff of the different regiments, in the proportion frequently of 1 to 250, of which number 5 or 6 can scarcely require medical aid. A reduction, therefore, might be advantageously made of officers' salaries of L.5000 a year, as a deputy and inspector-general, four staff-surgeons, and four assistant-surgeons, would be fully equivalent to perform the various duties of Ireland. It may further be observed, that such officers ought not to be civilians, but drawn from the half-pay of the medical department of the army.

East Indies.—Until within a few years, the medical management of his Majesty's forces in India was entrusted to the Medical Boards of the Honourable the East India Company, and it may be said efficiently performed. Much, however, in opposition to these bodies, a staff medical officer, with the rank of inspector-general, or deputy inspector-general of hospitals, belonging to the King's troops, has been sent from this country, to each of the Presidencies, at the cost in all of about L. 6000 a-year. These appointments have caused no small enmity on the part of the Honourable Company's Medical Boards; and as they are decidedly of no use, the affairs of the King's troops having been just as well managed before, should most certainly be abolished, as creating most useless and unnecessary expence, besides some discordance which did not previously exist.

Colonies.—We observe that an inspector-general of hospitals is employed at Gibraltar, at an expence of L.1200 a-year, including his allowances, which is quite unnecessary. An assistant-inspector of hospitals, formerly called physician to the forces, of which number there are about thirty on the half-pay list, might surely be employed at a much smaller rate of pay; and as the diseases there are chiefly medical, and the arrangements required more of the nature that fall to the lot of the physician, this change will surely be allowed one of advantage in all respects.

Cape of Good Hope.—For many years past a staff-surgeon has been in charge of the medical concerns there. Why is a deputy inspector-general of hospitals *now* employed, thereby increasing expence with so small and so healthy a force? The same may apply to the Mauritius.

General Remarks.—If the above suggestions are acted on, the efficacy of the medical department would be increased, and a saving of nearly L. 20,000 a-year would be effected,—and it is recommended that, in lieu of the London Board, an inspector-general of hospitals, an assistant-inspector of hospitals, and one staff-surgeon, with two clerks, with apartments in the War-Office, should undertake the management of the department, aided by the district staff-surgeon now employed; and that a deputy inspector-general of hospitals, four staff-surgeons, and four assistant-surgeons, should undertake all the medical-staff duties of Ireland,—where, it must be recollected, there is a very large regimental medical force.

The retiring salaries of the different officers to be reduced should be regulated by their merit and honest discharge of the duties assigned them, as regards superiors. Those of inferior rank are already specified in the army regulations; and none of the highest should exceed L. 800 a-year. No notice in this statement is taken of a medical force of about seventy assistant staff-surgeons; it must be allowed no small number of contingent officers to be employed as may be most beneficial—these being wholly unconnected with regiments, each of whom abroad amounting at most to 800 men, have three medical officers, so that if considered necessary further reduction of expence may be effected. The regiments of militia now raising may be supplied also as a saving of expence with half-pay and invalid staff-surgeons, regimental-surgeons, and assistants; for having just done away with the expence of their medical officers, it would be injudicious to appoint others to reap benefits unconnected with claims of service of any kind.

INDEX.

ABDOMEN, case of rupture of, terminating in union, . Page 271
Aberdeen. *See* Macrobin.
Africa, on the diseases of its western coast, . . . 136
Albumen, on its presence in urine of dropsy, . . 54
Amputation. *See* gangrene.
Anus, artificial, ensuing in gangrene, 250
Aorta, on patency of its orifice, 225
Army, on the half-pay of the medical officers of, . . 221
Artificial mineral waters, Institution for, at Brighton, . 440
Beulah, on the mineral springs of, 439
Blandin, his illustrations of surgical anatomy, . . 210
Blood. *See* Hall.
Brain, on its anatomy, physiology, and diseases, . . 408
Brighton, Institution at, for artificial mineral waters, . 440
Boyle, Mr, his account of the Western African coast, . 136
Burt, Mr, his illustrations of Blandin's surgical anatomy, 210
Campbell, Dr, his surgical cases, 245
Carlsbad. *See* Brighton.
Conception, on the intervals between the periods of, in women, 1
Corrigan, Dr, on patency of aorta, 225
Cholera, works on, reviewed, . 178
——— in Sunderland, . 214
——— on an epidemic of English in the Medway, . 295
——— on the malignant epidemic of Newburn, . . 337
——— on the treatment of, by tartar emetic, . . 445
Christison, Dr, on the effects of eating opium, . . 123
Circulation. *See* Hall.
Cow-pox, on its identity with small-pox, ... 269
Cock, Dr, on the connection between dandy and scarlet fever, . 28
Contagion, on the evidence of that of cholera, . . 372
Craigie, Dr David, his account of the epidemic cholera of Newburn, 337
Dandy fever, on its connection with scarlet fever, . . 28
Dropsy, on that from diseased kidney, ... 54
Elements. *See* Liston.
Excision, case of that at the elbow-joint, . . . 113
Eye and eye-lids, case of destruction of, . . . 251
Face, excessive destruction of, 256
Fever, on infantile remittent, 115
Forbes, Dr John, his cyclopædia of practical medicine, . 429
Gangrene, traumatic, case of, with amputation, . . 245
Glasgow, on its statistics, . 224
Gregory, Dr James, on diseased kidney with albuminous urine, 54
Hall, Dr Marshall, on the circulation, . . 164
Hall, Mr James, on an epidemic of English cholera, . 295
Hamilton, Sir William, his inquiries on the proportions of the brain, . . 415
Health, Edinburgh board, report of, . . . 219
Heart, Dr Hope's work on the diseases of, . . 385
Henry, Dr, on the relations between the functions of nerve and muscle, 11
Hernia, inguinal, case of, terminating in artificial anus, . 250
Hope, Dr J., his work on diseases of the heart, . . 385
India, on the pathology of abdominal diseases in, . . 388
Intestines, on the morbid changes of, in India, . . 308
Iron, Mr Kerr on the use of the persesquinitrate, . . 99
Kerr, Mr David, his case of incision of the elbow-joint, . 113
—— *Mr William*, on the use of the persesquinitrate of iron, 99
Kidney, Dr Gregory on diseases of, 54
Labium pudendi, excision of tumour from, . . . 25
Lactation, on the evils of protracted, 433
Lewins, Dr, on infantile fever, 115
Lichtenstadt, Prof. his first and second numbers on cholera, 178
Liston, Mr, his elements of surgery, 418
Liver, on the morbid changes of in India, . . . 308
Logan, Mr, his cases in surgery, 270
Luxation, one reduced with unusual facility, . . 270

Mania, inspections of cases in the Aberdeen Asylum, . Page 436
Macrobin, Dr, his dissections of maniacal cases, . . 436
Marienbad. *See* Brighton.
Medical staff of army, present distribution of, . . 446
Medicine, Cyclopædia of, noticed, 429
Mineral waters, artificial, institution for, . . . 440
Monro, Dr, his anatomy of the brain, . . 408
Morehead, Dr C., on the pathology of the abdominal viscera, 308
Morphia, on the medical effects of the muriate of, . . 278
Morton, Dr E. on the evil of protracted lactation, . 433
Mouth, contraction of, requiring operation, . . 255
Murder, medical evidence distinguishing it from homicide, 94
Nerve and muscle, on the relations between the functions of, . 11
Newburn, on the epidemic malignant cholera of, . 337
Norwood, on the mineral spring at Beulah in, . . 439
Opium, on the effects of eating, 123
Orton, review of, on cholera, 178
Parotid gland, excision of a tumour from the site of, . . 23
Pharynx, tumour of, in an infant, removed, . . 272
Playne, Mr, on the identity of cow-pox and small-pox, . 269
Pyrmont. *See* Brighton.
Radford, Mr, on turning, . 263
Remittent infantile fever, Dr Lewins on, . . . 115
Report of Edinburgh Board of Health, . . 219
——— of Edinburgh Surgical Hospital, . . 325
Roberton, Mr, on the intervals of conception in women, . 1
——————— on turning, . 263
Robertson, Dr Montgomery, on the muriate of morphia, . 278
Scarlet fever of St Bartholomew, observations on, . . 28
Scapula, on a newly observed ligament of, . . 433
Sherriffs, Mr, his new ligament of the scapula, . . 432
Sierra Leone, on the insalubrity of, 155
Small-pox, on its identity with cow-pox. . . . 269
Spina Bifida. *See* spinal chord.
Spinal chord, tumour expanding it, 270
Splanchnic nerves, engravings of, 431
St Bartholomew, on scarlet fever in the island of, . 28
Staff, medical, of army, distribution of the, . . 446
Stedman, Dr, his surgical operations, . . . 20
Suckling. *See* Morton.
Sunderland, on cholera in, . 214
Surgery, Mr Liston's work on, 418
——— Mr Syme's work on, 425
Surgical anatomy. *See* Blandin and Burt, . . .
Swan, Mr Joseph, his plates of the great sympathetic and splanchnic nerves, . . 431
Syme, Mr James, his report of the Edinburgh Surgical Hospital, 325
——————. his principles of surgery, . . 425
Sympathetic. *See* Swan.
Tumour. *See* spinal chord, pharynx, and *labium pudendi*, .
——— one removed from the *labium pudendi*, . 25
Turning, Mr Radford on the obstetric operation of, . . 256
———, Mr Roberton on, 263
Tweedie, Dr, his Cyclopædia of Practical Medicine, . 429
Urine, albuminous, connected with diseased kidney, . . 54
Vagina, imperforate, operation for, performed, . . 26
Waters, mineral, artificial, prepared at Brighton, . 440
Watson, Mr Alexander, his medico-legal cases, . . 94
Weatherhead, Dr, his account of the Beulah spring, . 439

END OF VOLUME THIRTY-SEVENTH.

No. CXII. will be published on the 1st of July 1832.

DEC 4 1916

EDINBURGH:
PRINTED BY JOHN STARK,
Old Assembly Close.

UNIVERSITY OF MICHIGAN
3 9015 06269 1525

BOUND
AUG 13 1930
UNIV. OF MICH.
LIBRARY